The Manufacturing Confectioner

TECHNOLOGY DEPT.

ONEER SPECIALIZED PUBLICATION FOR CONFECTIONERY MANUFACTURERS

TECHNOLOGY DEPT.

The Meeting and . . . the Function

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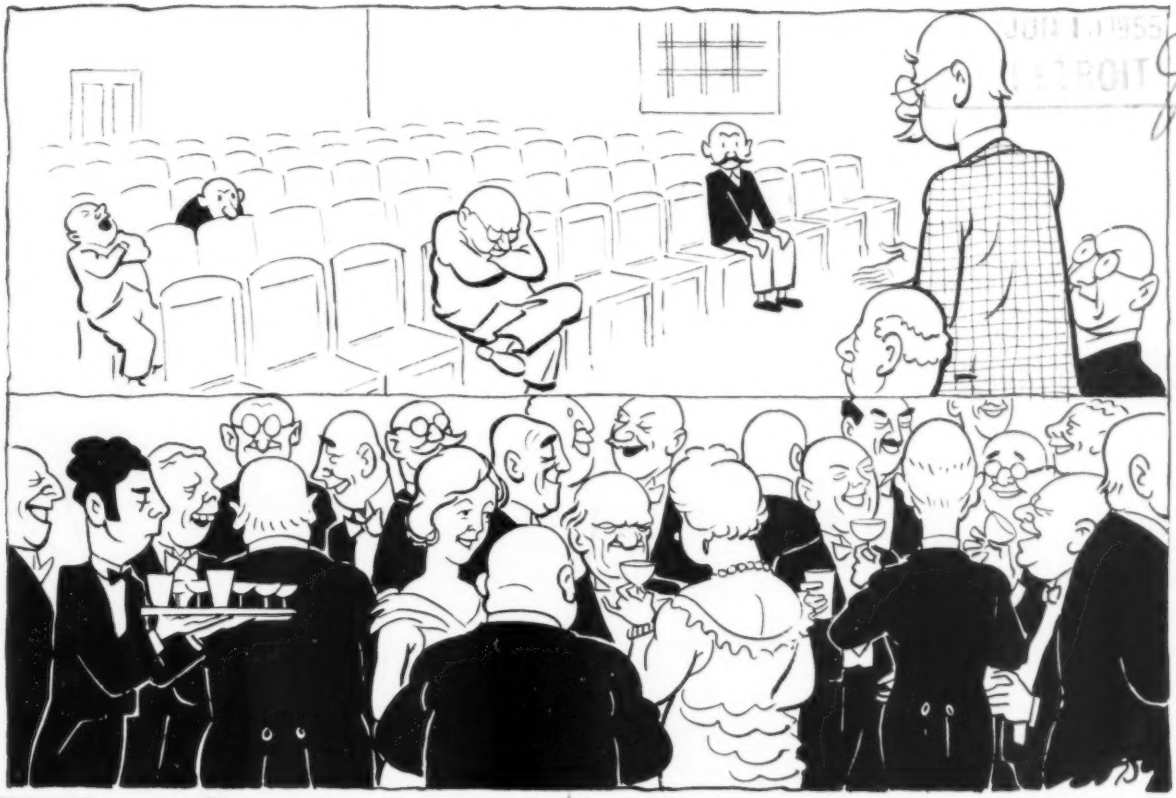
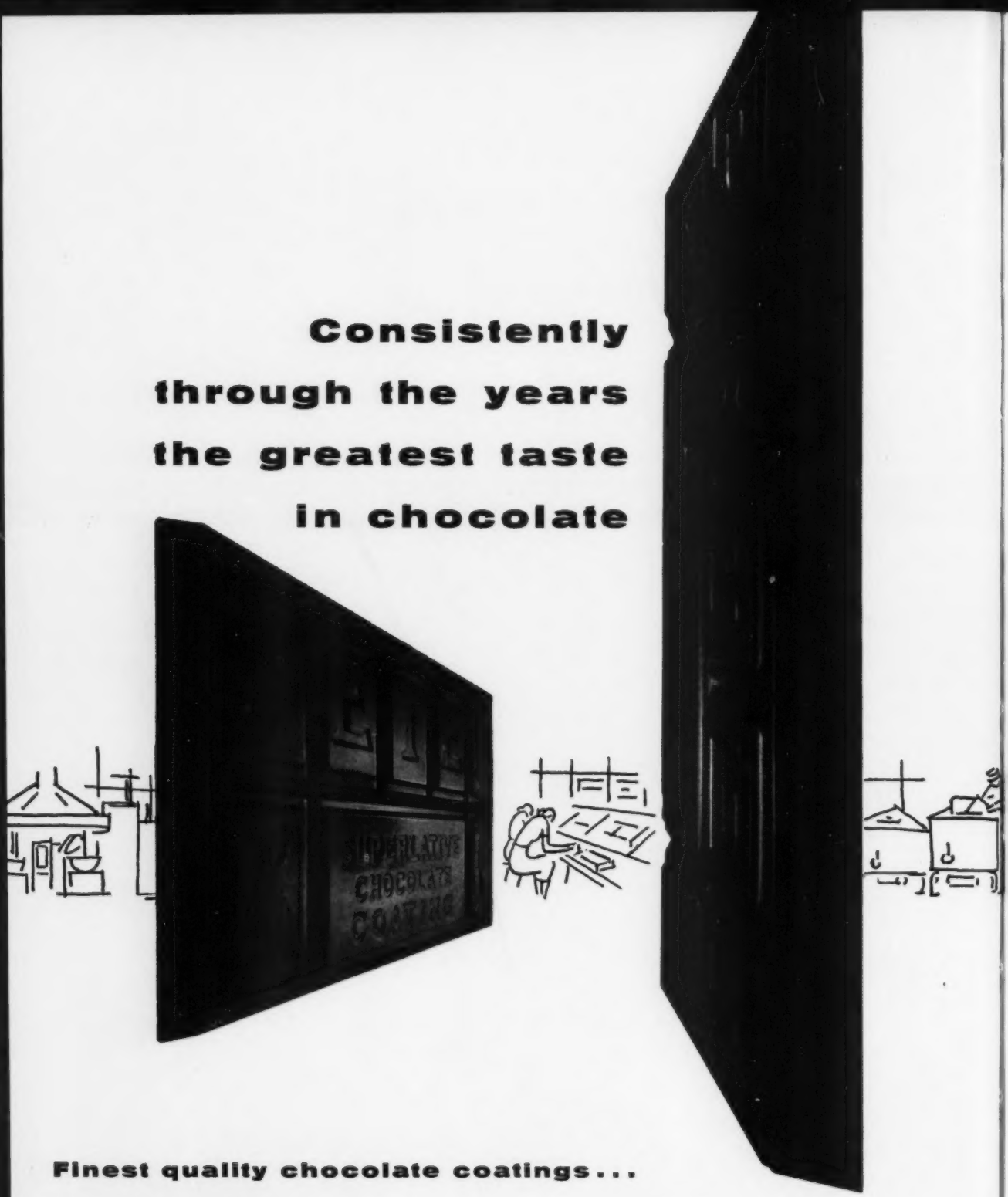


JUNE 1955

Production Conference Proceedings

NCA Convention Program

Consistently through the years the greatest taste in chocolate



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By being better! Unmatched through the years is the *California flavor* that distinguishes Exchange Brand Oil of Lemon. That's why Exchange remains the overwhelming sales leader—in fact, the *4-to-1 favorite* over all other lemon oils combined!

So why skimp on quality...insist on Exchange quality and flavor that come *only* from genuine California lemons, grown and skillfully processed by Sunkist Growers.

Sunkist Growers

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Exchange®

OIL OF LEMON U. S. P.

Let Fritzsche's Experimental Food Laboratory Help You With Your Candy Flavoring Problems

Test candy batches made in our Experimental Food Laboratory, above, provide candy manufacturers with a practical basis for correct flavor evaluation and comparison. The service this laboratory offers is especially useful in the selection of flavors designed to create those special taste effects which manufacturers sometimes strive for in their deluxe assortments. It enables us to help them in the most practical way possible to judge the relative merits of any flavors they may have under consideration, whether they be of the custom-made variety or regularly offered stock flavors. Therefore, as a first step in correct flavor evaluation, why not take advantage of this unique laboratory service *before* undertaking factory-scale batch tests of any untried flavorings?

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Also available:
NEW FLAVOR DATA SHEETS
featuring HARD CANDY
APPLICATIONS *and*
MAPLE FLAVORING SPECIALTIES

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The Manufacturing Confectioner

Vol. XXXV No. 6

June 1955

Edited and Published in Chicago

The Candy Manufacturing Center of the World

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COVER: The cartoon on the cover is reprinted from Confectionery Journal, England, with their permission. We trust that it is self-explanatory.

Founder—EARL R. ALLURED

Publisher—P. W. ALLURED Editor—STANLEY ALLURED

Eastern Manager—JAMES ALLURED Technical Editor—WESLEY CHILDS

Sales Manager—ALLEN ALLURED English Representative—M. G. READE

Circulation Director—M. SEELMAN

Publication Office	Eastern Office	London, England
418 N. Austin Blvd.	303 W. 42nd St.	Prospect House
Oak Park, Illinois	New York 36, N. Y.	Heath Street N.W.3
Euclid 6-5099	Circle 6-6456	

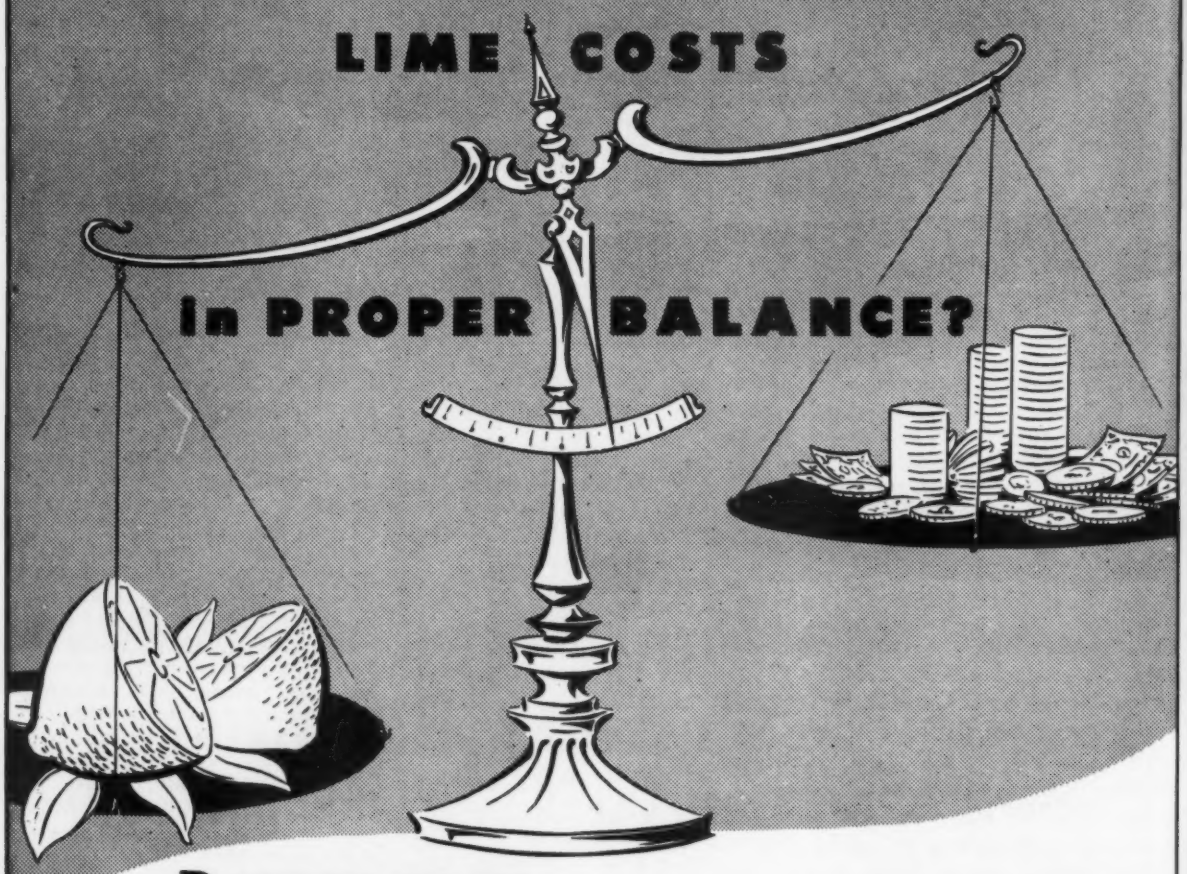
Published monthly except June when published semi-monthly by **The Manufacturing Confectioner Publishing Company**, publishers of **The Manufacturing Confectioner—The Blue Book—The Candy Buyer's Directory.** Executive offices: 418 No. Austin Blvd., Oak Park, Illinois. Telephone VIllage 8-6310. Eastern offices: 303 West 42nd Street, New York City 36, N. Y. Telephone Circle 6-6456. Publication Offices: 1309 N. Main St., Pontiac, Illinois. Copyright, 1955, Prudence W. Allured. All rights reserved. Subscription price: One year, $3.00. Two years, $5.00. Per copy, 35¢. In ordering change of address, give both old and new address. Entered as second class matter at Indianapolis, Ind., application for re-entry at Pontiac, Illinois, pending. Member: National Confectioner's Assn., Western Confectionery Salesmen's Assn., National Candy Wholesaler's Assn., Audit Bureau of Circulation, Associated Business Publications. Foreign subscriptions: One year, $5.00. Two years, $7.50. Canadian Subscriptions: Same as U.S.

The Sweet and The Sour

The PMCA Production Conference just seems to keep rolling along, breaking attendance records each year, and providing a better and more varied schedule of speeches. This year for the first time, movies were shown on raw materials, the operation of machinery and methods of small scale candy making for development work. We do not know what the inovations will be next year, but we do know that Hans will come up with some new idea to stimulate thought and ideas among those attending. And speaking of Hans, it is hard to see how he could be given too much credit for the drive he provided in getting these programs started, and in keeping them on an ever higher level each year. While his only reward is the appreciation of those who realize the magnitude of his contribution to the industry, the industry will benefit forever afterward from the tradition of cooperation and sharing of information that he did so much to develop and promote.

The lollypop has really come into its own the last few weeks, as the Salk anti-polio shots have been given throughout the country. Abe Josephsohn, president of the National Confectionery Salesmen's Association, advises us that he has never seen such consentrated interest in a single type of candy as there is in the lowly pop right now. Actually, the number of pops that are being used as a "soother" after a Salk injection is not large, as only about six million shots are expected to be given this year (which is just a good weeks output for some of the large pop plants). However, the reams of favorable newspaper, radio and TV publicity is something else, and is the real push behind the popularity of the pop. In fact, it really should do all candy a lot of good, to have this one type given so much credit for the success of the Salk program.

ARE YOUR LEMON AND LIME COSTS In PROPER BALANCE?



P & S IMITATION LIME OILS
IMITATION LEMON OILS
CAN BALANCE YOUR FLAVOR BUDGET...

THEY CAN...

- Be used alone when economy is your prime problem.
- Act as extenders when natural oils are high in cost.
- Help you meet competition in certain areas.
- Replace the natural oils on a pound for pound basis.

THEY WILL NOT...

- Sacrifice your quality for economy.
- Impart a harsh, synthetic taste.
- Become rancid or "terpeney.
- Lose their strength through high cooking or baking temperatures.

All these budget and flavor balances are assured you when using P & S IMITATION CITRUS OILS, because they have been perfected by master flavor craftsmen.

If you are interested in obtaining the most for your flavor dollar, write for free samples today.

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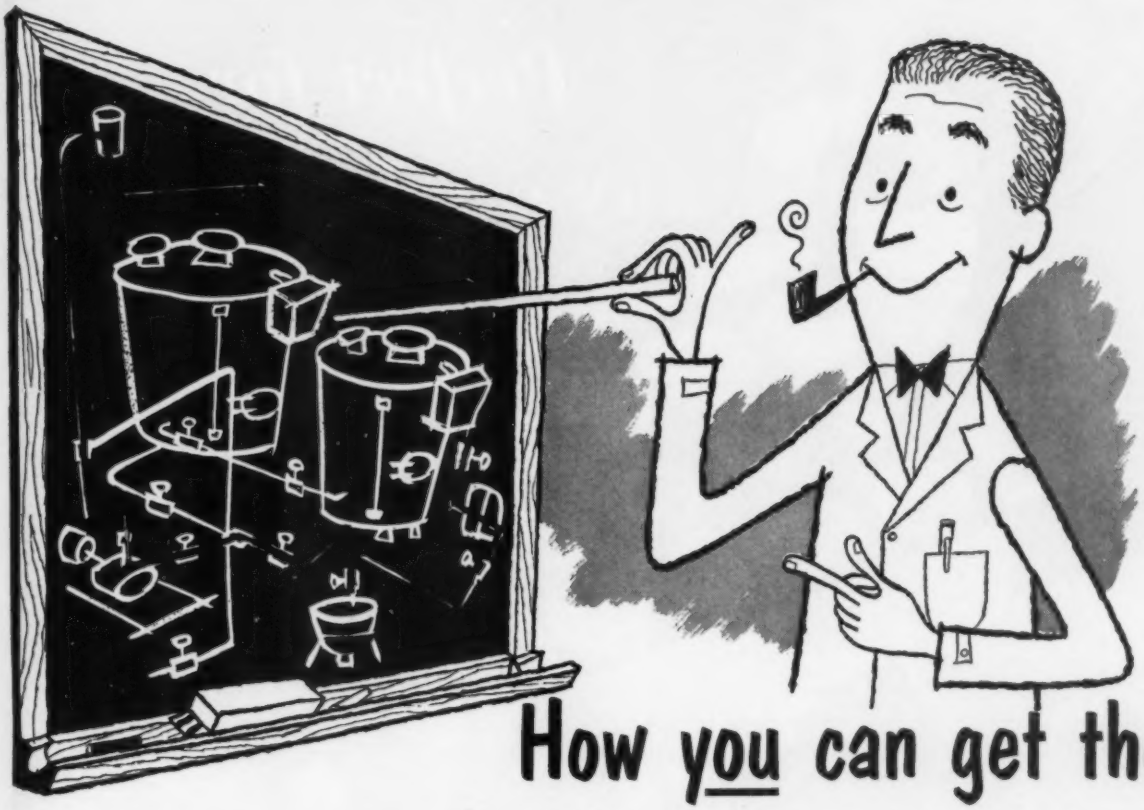

How you can get the most out of a liquid sugar system

"These three hints," maintains your Flo-Sweet Engineer, "will help you get the most out of your liquid sugar system.

"First, make sure the system is designed by engineers who are experienced both in liquid sugar and in the technology of your food products.

"Second, have these engineers install the system.

"And third, use only top quality liquid sugar, blended accurately to your individual specifications.

"Here at Flo-Sweet we're in the habit of helping food manufacturers with all three of these important steps. In fact, that's our one and only business. If you aren't already enjoying the convenience . . . the sanitation . . . the cost-cutting and quality-improving advantages of a Flo-Sweet system — why not check with us today?"

"MUST" READING FOR EVERY SUGAR USER: This authoritative new manual contains over 200 pages of detailed information on the design, installation and operation of liquid sugar systems. It covers the use of liquid sugar in major food industries, provides a wealth of technical data on liquid sugar itself, and gives specific information on performance and costs. A valuable reference work for every food technologist's library. Price $5.00.

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GLOBE® Corn Syrup blends perfectly with your hard-candy ingredients...prevents undesirable color, stickiness and graining from marring your goods.

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FOR SOFT GOODS...

REX® Corn Syrup gives body and controls moisture in your marshmallows and gum work.

FOR MARSHMALLOWS AND CARAMELS...

CERELOSE® brand dextrose sugar gives you more fluidity with less water than any other sugar... controls fermentation and starch-crust formation in marshmallows . . . makes for more tender-eating caramels.

Just give us a call and let our technical staff show you how to get the best results with these superior quality corn products.

CORN PRODUCTS REFINING COMPANY
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You are cordially invited

to visit booths 404 and 405 at the 72nd Annual National Confectioners' Association to be held at the Conrad Hilton, Chicago, Ill., on June 6th through 9th, 1955.

Whether you're interested in chocolate handling, coating, cooling, or packing, you will profit from a visit to these Greer booths. Let Greer experience and know-how help you — all along the line.

We are looking forward to seeing you.

J. W. GREER COMPANY

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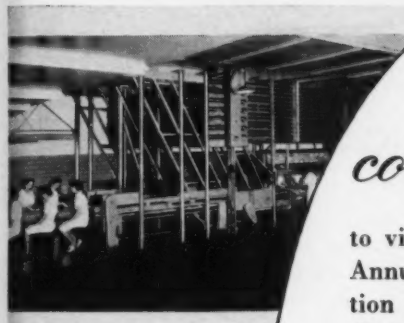
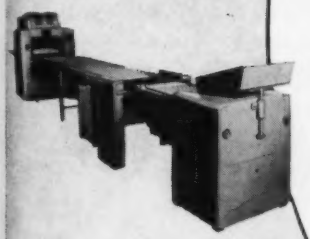
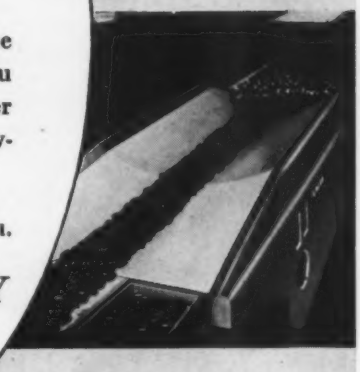
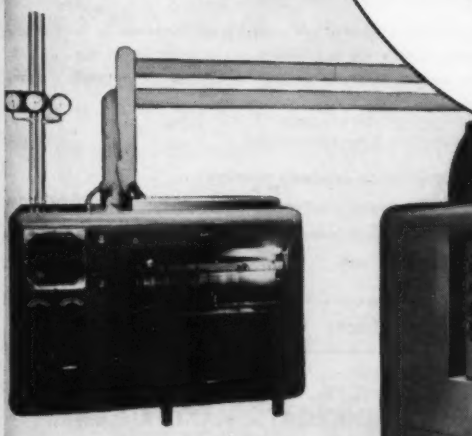
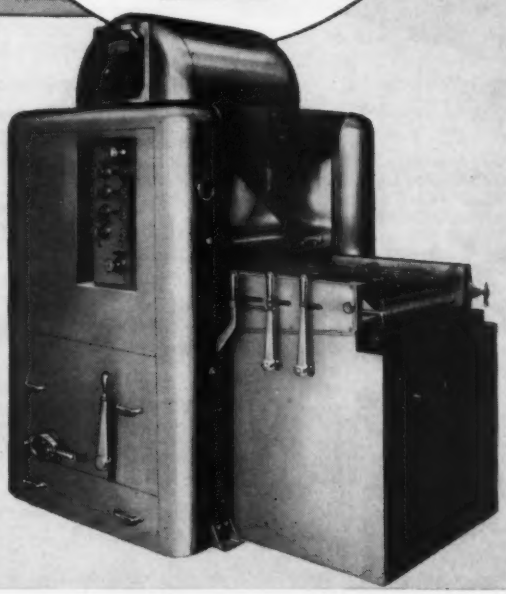




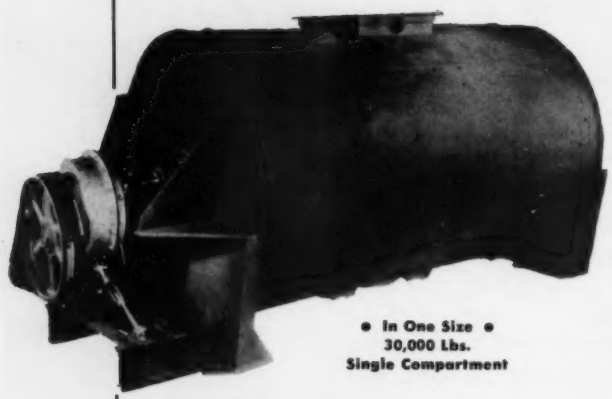






HERE'S GOOD NEWS!

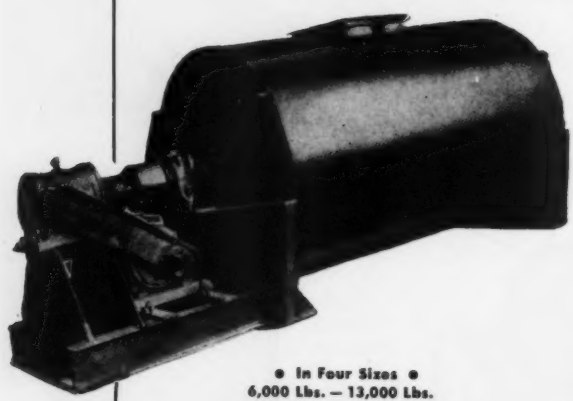
Stehling Introduces a LIGHT-DUTY MIXER for LIQUID CHOCOLATE RECEIVING and STORAGE



• In One Size •
30,000 Lbs.
Single Compartment

• Here is a new light-duty Stehling Chocolate Mixer, especially designed for receiving and storing liquid chocolate. Only slightly lighter in construction than the standard mixer, it has the same superior mixing action, is a rugged piece of machinery, and is built for years of trouble-free service. Power consumption is low, through a simplified drive, as shown at the left. Overall length, is reduced, as well as weight, compared to the standard mixer. It is Stehling's answer to those who do not need the heavy-duty construction of the standard Stehling Chocolate Mixer.

Standard Construction Now in FOUR Sizes



• In Four Sizes •
6,000 Lbs. — 13,000 Lbs.
20,000 Lbs. — 30,000 Lbs.
Single or Double Compartment

• Climaxing over 25 years of supplying mixers to the chocolate, confectionery and bakery trade, Stehling now furnishes a 30,000 pound mixer, the largest yet built by Stehling, in response to demands for a mixer of larger capacity.

Stehling Chocolate Mixers are used by confectioners to melt whole 10-lb. cakes rapidly; by chocolate manufacturers for processing their chocolate; and by bakeries for making or melting chocolate or compound coatings.

Stehling's give you these advantages:

- Uniform viscosity for maximum coverage
- Spiral-activated mixing action
- Low power and heat consumption
- Low maintenance costs

• Write Today for Details and Prices •

• USED BY LEADING CONFECTIONERS, BAKERS, and CHOCOLATE MANUFACTURERS •

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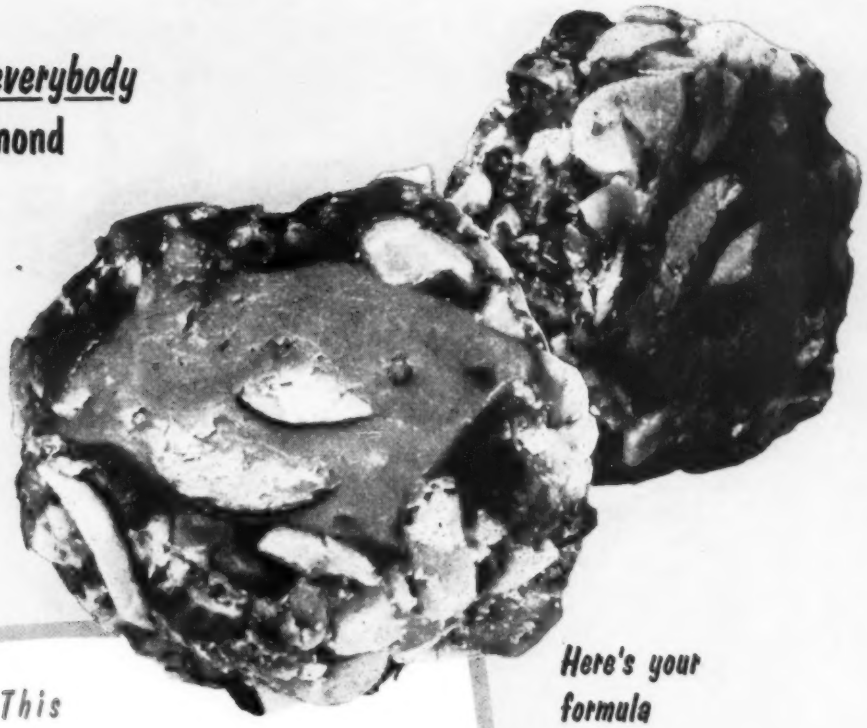
Almost *everybody* likes Almond Candies



Try This

CARAMEL ALMOND FUDGE ROLL

Putting almonds in a candy doesn't *guarantee* a best-seller . . . not quite. But, in the words of the candy maker who made the test-batch for this photo, "*Any* combination of almonds with chocolate or caramel is a sure bet".

It's an equally good bet that *Blue Diamond* almonds can minimize handling costs in your plant. Blue Diamonds are *double-sorted,* by hand and by photo-electric eye. They are accurately size-graded, free from bitters, dust, or foreign particles, with controlled minimum moisture content. Write for prices, samples and free formula booklet . . . on your company letterhead, please.

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CALIFORNIA ALMOND GROWERS EXCHANGE
Sacramento, California

BLUE DIAMOND BRAND

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Here's your formula

Part 1

10 lbs. brown sugar
10 lbs. white sugar
15 lbs. corn syrup
1½ lbs. coco butter
3 qts. water
10 lbs. evaporated milk
2½ lbs. nougat cream (Mazzetta)
15 lbs. fondant cream
15 lbs. Blue Diamond Chopt Natural* Almonds
Salt (to taste)
Maple flavor (to taste)

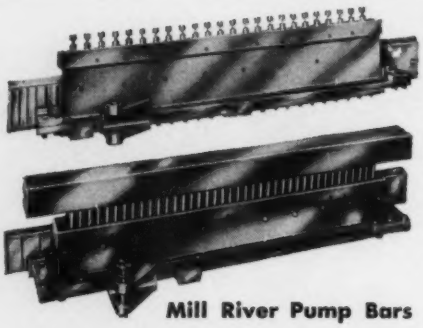
Place sugar, corn syrup, cocoanut butter and water in cooking kettle. Cook to boil. Add milk slowly as not to break boil. Cook to soft caramel test (236°) . . . Remove from furnace. Add nougat cream, mix in thoroughly. Add fondant, mix in thoroughly. Add almonds, flavor and salt. Pour ½" thick on wax-lined wooden table. Let set and cut to desired size. (¾" wide x 6" long)

** or chop your own from Blue Diamond Sheller Run*

Part 2

20 lbs. brown sugar
30 lbs. corn syrup
3 qts. water
2 lbs. butter
12 lbs. evaporated milk
Salt (to taste)
Vanilla flavor (to taste)
Ground or chopped Non-pareil Chopt Natural* Almonds, roasted.

Place sugar, corn syrup and water in cooking kettle. Cook to boil. Add milk slowly as not to break boil. Add butter and salt at soft ball test. Cook to caramel test. Add flavor, mix in slowly. Dip fudge in caramel with forks, roll in ground roasted almonds. May be sliced when caramel has set.



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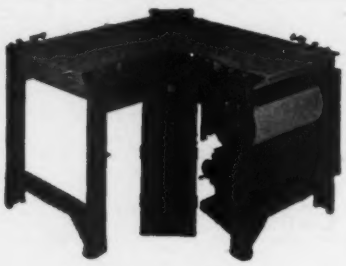
Faster, better, and more accurate due to precision workmanship. Water-sealed—Sanitary—No Grooves—No Washers.
Available in all sizes.
Single, double, triple and quadruple raw for all depositors.



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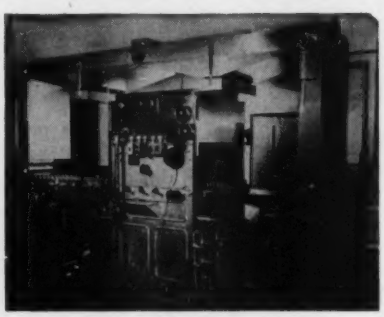
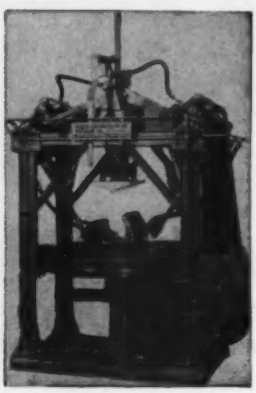
Economy Belturns concerve space through efficient arrangement of cooling conveyors and packing tables. Bunching and crowding eliminated. Available in all standard widths:
12" to 48"
90°, 180° and special angles.



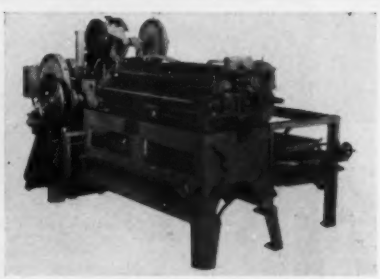
Hontz Cluster Machine

Completely automatic unit requires only the part time attention of enrober man.
Forms uniform clusters of any free flowing nut.
When not in use easily elevated permitting run of other goods through enrober.

BERKS HARD CANDY MIXER



Mixes color, flavor and acid in 75 to 125 pound batches at rate of 1000 lbs/hr., 10% scrap may be included. Saves labor and floor space. Assures uniform mixing and constant rate of production through the day.



HOHBERGER AUTOMATIC BALL MACHINE

Only one operator required to produce up to 1200 lbs. per hr.
You can produce balls, clear, pulled or honeycombed filled—9/16" to 1-1/2" diameter.
Sunbeam starlights: stripes brought down to center without expensive inlay.
Root Beer Barrels and any other shapes.

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Without Nails

by Johnson Products Co.

Starch trays
Stock trays
other Special wood products

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THERE IS ONLY ONE BEST FOODS' GRADE OF QUALITY
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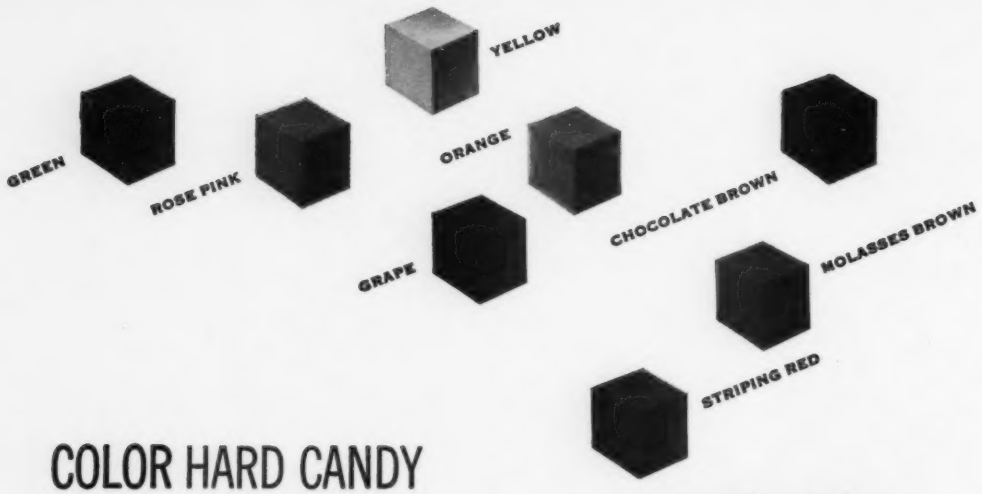
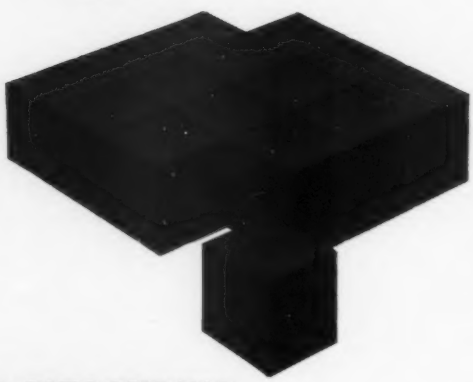


COLOR HARD CANDY QUICKLY! ACCURATELY! ECONOMICALLY!



ATLAS SELF-MEASURING CERTIFIED COLOR CUBES

QUICKLY! Atlas Self-Measuring Color Cubes are the *fast, easy, fool-proof* way for *anyone* to color a hard candy batch of *any* size. Atlas Color Cubes are readily and fully soluble in hard candy. Just use 1 cube to color a 35 lb. batch.

ACCURATELY! The *patented* self-measuring* feature of Atlas Color Cubes guarantees dependable color uniformity in every batch. In a 1 lb. box, each of the 8 2-oz. squares is precision-scored to form 16 color cubes per square. They break off easily and exactly, assuring accurate color control every time.

ECONOMICALLY! Atlas Color Cubes save you time and money. No waste — no muss — no time lost preparing pastes—and everything, even hands, are kept clean. And just 1 lb. will efficiently color approximately 4,500 lbs. of hard candy.

Want proof ATLAS Certified Color Cubes are best for your needs? Try a box . . . if not entirely satisfactory return the unused portion for full credit.

ANOTHER COLORING "FIRST" FROM THE FIRST PRODUCERS OF CERTIFIED COLORS

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The relative sweetness of some sugar solutions — a new angle

by ROBERT WHYMPER

I do not remember seeing the question of 'The Relative Sweetness of Sugars' seriously discussed in the 'M.C.' though frequently mentioned in one way or another as an item of interest. It is, perhaps, a matter of interest rather than of importance—that is to say it has become an amusing game open to scientists, amateurs, students seeking an apparently simple subject for a thesis, advertisers, expert tasters and others not so expert, mixed panels, lady-like 'domestic economists', and, in fact, to anyone with more or less active taste-buds, the gift of God but as useless for our purpose here as is finger-touch in attempting to estimate moderate temperatures elsewhere without long and unceasing practice. But, since there is no mechanical device or instrument capable of scientifically gauging the degrees of 'sweetness', the so-called "organoleptic" method of evaluation has been universally adopted, which means that the old adage "In matters of taste there can be no disputing" can logically be applied to the present subject also, even if the word 'taste' therein has occasionally a different meaning. Yet enough disputatious arguments have been written about the correct ways and means for reaching the truth of the matter (never yet conclusively proved) to fill a volume the size of the N.Y. 'Telephone Directory', no less than 118 references being given by the late Prof. A. T. Cameron, C.M.G., D.Sc., F.R.S. (Canada) in his 72-page publication 'The Taste Sense & The Relative Sweetness of Sugars and Other Sweet Substances' ('Sugar Research Foundation, Inc.', New York, Dec. 1947). This misnamed document of a true scientist is considered as a definitive exposition of the case by most persons content with the authoritative voice of a leading Biochemist and the procedure by which he reached his conclusions. But Cameron would have been the first to acknowledge (as, indeed he did at last in his closing paragraphs) that the final word has not been written; and there are some among us who, with far greater experience in the particular Art of Gustation than had the Professor or his students, would query the accuracy of many of his accepted findings while admiring the unquestionably fair, complete, even mathematical survey of the whole field made by him and his collaborators. Any subject treat-

ing with 'sweetness' must, moreover, be of some commercial interest to Candy Makers, and the nearer the truth that can be reached, however theoretical, the better use can they make of the conclusions, if they themselves have not already discovered the practical facts of the case.

Long prior to Cameron's published work, and commencing about 1920, I had myself made many tentative experiments on the relative sweetness of *commercial* sugars, though my sense of taste had not then been trained to the present degree, and I would not at that time have dared to express in irrevocable printed words my inconclusive findings. The following years (See Table I) brought a crop of publications on the subject with results as inconclusive, however, as my own, but it was not until the work of A. C. Dahlberg and E. S. Penczek (N. Y. State Agric. Exp. Stn. No. 258, April 1941) brought home to me that the subject was being taken seriously, though for commercial reasons rather than scientific, that I realized I was about qualified to enter the game.

The D. & P. statement that at 40% concentration in water Dextrose was of equal sweetness to an aqueous solution of Sucrose at the same concentration I just could not confirm even when using the same technique as that recommended by the authors. The reasons for this difference of opinion may be realized by the reader later, and, after due consideration and a number of further experiments, I decided to reopen the question with a slightly different technique which I discussed with the late Dr. Stroud Jordan. Dr. Jordan was a scientist of integrity, and, as a past Consultant for a leading Dextrose Manufacturer and the then Chemical Adviser to the American Sugar Refining Co., no more experienced a person could be found to express a frank opinion. Dr. Stroud Jordan immediately saw my new point of view and approved my new method of approach to the experiments, as also did the late Mr. E. Whitman Rice of the National Sugar Refining Co., both of whom assisted Cameron with their advice in his publication (acknowledged in the fore-word), yet neither divulged the direction of my work already well in hand—a respect for confidential information natural to such men. The delay in the publication of my results until now has been due to many reasons, mostly ethical, while the lapsed years between the experimental period and the present time have allowed mature consideration and further confirmation of the right to my own expression of opinion regarding the relative sweetness of sugars that seems to differ from that of the presently accepted and 'shelved' assertion.

Before any discussion on the matter is legitimately permissible, the air must be cleared of some foggy misconceptions. First of all—the titles and headings of published articles and treatises on our subject (including Cameron's), and the subject-matter thereof, nearly always refer to 'The Relative Sweetness of SUGARS' whereas none of them does, in fact, deal with SUGARS but only with aqueous solutions of some of them. This is no attempt on my part at carping logomachy to confuse further the already involved issue, but remains a statement of fact which anyone capable of reading and with interest in 'taste' can verify. And, to be sure, it is an extremely important point when considering the whole question that rests for its answer upon human vagaries of taste-sensation. For example, in my very early experiments, young children (5-10 years old) were found to be in agreement with myself when asked to choose between Honey and another sample of very finely powdered Sucrose for the greater sweetness, the immediate answer being always in favor of the Honey or of commercial Invert Sugar when that was substituted for natural Bees' Sugars. This is not entirely a case of "out of the mouths of babes and sucklings . . ." since similar opinions have been freely expressed by older persons when put to the test. The reasons for this preference lie, however, in the double fact that there is, firstly, a quicker reaction by the taste-buds to *aqueous solutions* of sugars (of which natural Honey and commercial Invert Sugar are examples) than to a *solid sugar* such as powdered Sucrose requiring time, however short, to dissolve in the saliva before reaction occurs; and, secondly, that 50% of the solids of Invert Sugar or of normal natural Honey is Levulose, the sweetest sugar known to man and the one to which certain taste-buds react more quickly than to either Sucrose or Dextrose.

Thus can be visualized one complication in the vague rules of the game and why all experimentalists have resorted to *standardized solutions* of sugars rather than *100% dry* sugars for reaching their conclusions which, evading the real issue, are consequently misleading in word and fact. For, to any person of fair judgement and normal tasting-ability, there can be no argument against Levulose being sweeter than Sucrose, Sucrose than Dextrose, and Dextrose than Lactose, for example, when sampled in their pure undiluted state, though no exact *measurements* are possible. But, with this knowledge and a clear understanding that the game has so long been played that way (*via* aqueous solutions) as to amount to recognized precedent, I have had to accept the arbitrary rulings and, in consequence, can provide here *not* estimations of the relative sweetness of Sugars but *only* of a few of the aqueous solutions of some of them—using, however, a different sugar-standard of comparison as will be seen later.

Secondly, there is considerable misconception among the 'dilettanti' regarding individual 'taste'. According to biochemists, and repeated by Cameron, we have among us the Ageusiacs who have lost their powers of tasting "from toxic inflammation of the geniculate ganglion and in herpes oticus, a condition affecting the middle ear"; and Hypogeusiacs who suffer from diminished taste-sensation in the "anterior two-thirds of the tongue" (an area of considerable importance in our subject); and, more commonly still, the Parageusiacs with "altered or perverted taste" that may arise from head-injuries or other physical or organic defects, and temporarily during and following influenza. I have, indeed, known cases of all three types of these afflicted persons, and I have occasionally wondered, when sitting on the scores of tasting-panels that I have attended, which of my co-samplers were among the usually unaware sufferers from either of the two latter deficiencies in taste-sensation, because of the

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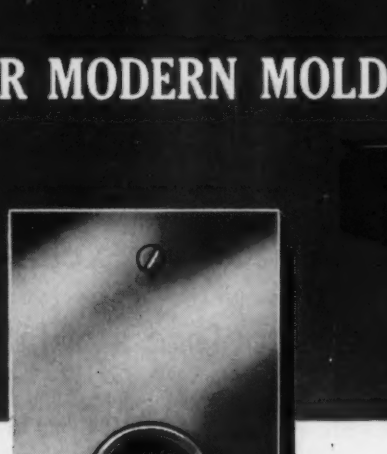

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erratic opinions sometimes expressed. There is, however, one thing made very clear to me in my 'Panel' experiences, and that is that, while there can be commonly found persons invariably able to gauge 'public taste' (the most *commercially* valuable asset for professional 'tasters' not disassociated from olfactory sensations), there are very few who can differentiate between fine niceties of genuine *taste*-sensations that could be used as a basis for *scientific* fact-finding.

Cameron records the now well-known experiments of Dahlberg and Penzcek in which the "experienced tasters" on their panel could detect differences in the sweetness of aqueous *Sucrose* solutions at the low dilution of 2% with an increment of 0.07 and at 50% concentration with an increment of 2.0, and with still greater delicacy at medium concentrations—from the findings of whom it was concluded by Cameron (with not complete consistency) that "Their results agree with those of earlier observers that Weber's law only applies to sweetness for the medium concentrations of sweet solutions". But this admission throws all results obtained with the very low and very high concentrations 'outside the law' of constancy while relegating them to the dark limbo of personal 'idiocyncracy' where anything might be deduced. In any case, Cameron's conclusion is fundamentally correct when dealing with aqueous sugar solutions, but it is no absolute criterion of ability to differentiate accurately between the sweetness of *all* sugars even in *medium* concentrations just because the chosen "experienced tasters" could claim to distinguish between relatively small differences in concentration at the *lower* and *higher* as well as medium concentrations of *Sucrose alone*. For, since our variously situated taste-buds within the mouth are not all equally responsive in all persons either to all *types* of sweetness (even of the sugars) or to different concentrations even of the same sugar, the experiments of D. and P. are open to criticism so long as we are discussing *sugar solutions*. And it must not be imagined that I am not aware of a somewhat similar weakness in our results recorded in Table II, with, however, the one redeeming feature that I have no complex regarding the Sucrose-Dextrose controversey but have endeavoured as far as possible to overcome some of the objections to the obvious unfairness of past techniques by the employment in my experiments of Levulose rather than Sucrose as the standard or unit of sweetness, in order to magnify any differences to be found between solutions of sugars less sweet than Levulose.

Thus, since it is now universally admitted that at the lowest concentrations of sugars (usually known as "liminal" or "threshold") differentiation in degree of sweetness becomes extremely difficult as it is at the highest concentrations also, it may be stated that all tests in the very low regions, such as those made by Biester, Willaman and cooperators (Am. J. Physiol., 73, 387-400, 1925), are without value in our immediate problem except when experimenting on the threshold of our ability to taste sweetness at all, which is extremely idiocyncratic among individuals. Similarly, in the higher concentrations above the "medium" of Cameron the results are equally under suspicion, which makes the positive assertion of D. and P. that 40% concentrations of Sucrose and Dextrose are equal in sweetness more emphatic than probably correct, while our own experiments in the higher ranges are only less subject to error owing to our rational change of standard of sweetness.

Thirdly, there is another misconception, or rather a complication, too frequently introduced in trying to reach the truth about *the relative sweetness of SUGARS*—a complication that amounts to something very like a 'red herring' deliberately drawn (by Cameron among others) across our path of pursuit, which, while possibly enlarging our knowledge of the reaction of our various taste-buds to *different sweet things*, is in no way helpful in classifying the *relative sweetness of sugars* which is our one purpose in this place, though confined only to aqueous solutions because of past precedent. The introduction of sweet non-sugars such as Glycerin, Dulcin, Saccharin, Glycine, Alanine solutions into the same tests with Sucrose, Dextrose, Levulose, etc. that genuinely belong to the Sugar Group is a 'red herring' not very savoury to my olfactory sense, since all persons' taste-buds situated in different parts of the mouth are not equally responsive to all chemical forms of sweet things, even among the sugars, and confusion is worse confounded by any such improper foreign interpolations. The findings that certain salts and other non-sugars (or certain mixtures of sugars) may increase or decrease the 'apparent' sweetness of some individual sugars in solution are also beside the point and tend to conceal the truth about *the relative sweetness of sugars as such* which, as already indicated, is no problem, except in its mathematical exactitude, when dealing with SUGARS in their pure, undiluted, unmixed state.

There is, of course, no doubt that the whole question of the relative sweetness of sugars was revived during the past twenty years owing to what has been politely called "Competitive Relationships between Sugar and Corn Sweeteners" justifying the publication of a document of 245 pages under that title in June, 1951, by 'The Production and Marketing Administration, United States Department of Agriculture', where members of the 'Sugar Branch' (whatever that consists of) were mainly responsible for its compilation (see 'Acknowledgements' therein). With the politics and lobbying in Washington, and investments in student-research in Universities regarding our subject we are not concerned here, yet I frankly admit that, in view of the commercial rather than scientific importance given to the Sucrose-Dextrose controversy, I am a little hesitant in swallowing hook, line, and sinker the lure of nicely assembled data, with attractive graphs, provided by sponsored reporters. Commercial exploitations somewhat similar to the Sucrose-Dextrose controversy can be seen in the Sugar-Caries financed researches, and, more particularly at this time of writing, in the Cigarette-Lung-Cancer battle of the statisticians notoriously competent in proving their case either way.

It remains a fact that, whatever our doubts about competence or motive among the researchers of our subject, *all sugars in solution tend to approach* (*and*

some may reach) *equality in sweetness as concentration rises* whereas, *in their pure undiluted state,* all sugars can be put in their proper, widely spaced order of sweetness by any inexpert taster other than the '. . . . iacs' mentioned. It is *not impossible* that Dextrose could reach the sweetness of Sucrose at some equally high concentration in water any more than that Sucrose should attain the sweetness of Levulose in the same manner, but the fact remains that *Dextrose does not make the grade* either in its pure undiluted condition or (according to my tests) in aqueous solutions at any concentration when Dextrose carries its maximum advantage in the *Sucrose-Dextrose comparison* if Sucrose is used as the unit of 'sweetness', and certainly much less so if the unit of 'sweetness' is Levulose. Nor should we be beguiled or misled in our pursuit by any such evasive suggestions as that different solubilities and rates of solubility, different viscosities, different chemical groupings, and other physical characteristics of the sugars (among other chemical compounds) are responsible for the figures recorded for 'sweetness' when dealing with aqueous solutions—for these factors, while unquestionably contributing in determining the results found in the cases of both 'dry' and 'wet' sugars, are merely *explanatory reasons for those findings.*

The question should be raised at this point why Sucrose solutions should have been adopted as the 'standard of sweetness' for comparison against solutions of all other sweet things when, by all admission, any *reduction* in concentration (of whatever sugar) tends to reduce its *relative* sweetness also—an obvious necessity in the case of Sucrose solutions when used to match solutions of other less sweet sugars, thus putting Sucrose at a disadvantage, however slight, with regard to Dextrose, for example. The only possible fair method of comparison when dealing with sugar solutions is to take as standard the solutions of the *sweetest sugar* known, namely Levulose, and to make all necessary adjustments in the concentration of *its* solutions while using concentrations of all other sugars in freshly prepared percentage quantities to match the changing Levulose solutions. Sucrose is, admittedly, obtainable anywhere in a highly pure and stable form, but that is no argument in a scientific investigation for its exclusive use as 'standard' when Levulose is also obtainable at some cost and trouble in a very pure form also. It may be argued also mathmatically that the change of *standard* of 'sweetness' does not alter the *relative* positions of the sugars on the scale of 'sweetness'—and this I have found to be true in my tests whether Sucrose or Levulose is used as standard, Dextrose being inferior in sweetness to Sucrose at any concentration tried, while I did not expect to find that Sucrose in solution could ever equal Levulose in sweetness at any concentration, a found fact that would appear, at first sight, to support the possibility of Dahlberg and Penczek's contention in their case for Dextrose against Sucrose.

The most controversial point in the whole of the organoleptic game is as to who is (or are) best qualified to pass an opinion (for it can be no more than that) on the relative sweetness of sugar solutions particularly in the higher concentrations. There are the advocates of hapharzadly chosen persons from among the general public since 'taste' is a common attribute (though our '. . . . iacs' are never mentioned); and there are others insisting on a panel formed of persons selected after passing certain arbitrary tests and designated "expert tasters"; and there are yet others who, with little or no training, have made their contributions, for better or worse, to the already large number of inconclusive figures to be found in trade and technical journals and inspired brochures. The situation is difficult, I admit, and, in all fairness, there is no doubt that, with modification, D. and P's approach is recognisably the most intelligent if, in my opinion, not wholly acceptable. For, in other fields of scientific or semi-scientific diagnosis and fact-finding, it is the *specialist* (a thoroughly trained and experienced man in his own branch) who is called in when any doubt exists, for example, regarding the conclusions of a general practioner in medical science. Therefore, in this particular matter of relative sweetness of sugar solutions, it is clear that a specialist in his particular branch of knowledge is, while not infallible, the most likely truth-finder, and, when supported by another specialist in the same field, certainly a 90% bet which is a pretty good gamble.

Somewhere it has been written (I think in 'Ecclesiastes', the words being spoken by 'The Preacher' who is said to have been Koheleth) "Two are better than one . . . . . for if they fall, the one will lift up his fellow, but woe unto him that is alone when he falleth!". With this warning before me and the Boy Scout slogan "Be Prepared' " (one of the wisest precautions in every walk of life), and with the further desirability of securing a reliable witness in any likely controversy, I asked Mr. Oscar A. Spiegelhalder, a man with nearly as many years of training as myself in the Art of Tasting, to check my findings in collaboration, and sometimes separately if differences between us called for it. Our averaged results of repeated tests (though averaging was seldom necessary) are shown in Table II—results which, sometimes curious, are, in my opinion again, certainly accurate within the limits of organoleptic possibility. If I should fall in the correctness of my estimations of the relative sweetness of the sugar solutions tested owing to later conclusions of a panel of more skilled and experienced persons in the organoleptic field, I shall have the satisfaction of knowing that, myself now past the age of proper discrimination (see Cameron), I shall have had one competent backer when others may need a panel of supporters to give a semblance of truth to their contentions.

Our original report, pigeon-holed for too many years, covered much the same physiological information as that so ably surveyed by Cameron later, and gave details of our method of procedure, of considerations concerning temperature and freshness of solutions under test, the water supply, the purity of the sugars used (particularly important in the case of Dextrose with its two unequally sweet chemical forms), and other factors that might have vitiated our findings if not taken into account. This original, much larger, report has been boiled down here to essentials most likely to interest readers of the 'M.C.'.

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It is perhaps worth recording that in still more recent years I have made several tentative efforts in numbing taste-sensations with local anaesthetics, the idea being to exclude all taste-sensations other than sensitiveness to 'sweetness'. There is some but very little published information on this subject (see also 'Cameron' p.10), the conclusions of Starling ('Human Physiology', not mentioned by Cameron), however, being confirmed by myself that gymnemic acid (or "chewing the leaves of 'Gymnema sylvestre' ", long used as a "remedy for hallucinations in taste" ('U.S.A. Dispensatory'), depresses the taste-sensations in the following order—(1) bitterness, (2) sweetness, (3) acidity, (4) saltiness—facts in no way helpful to our cause since sweetness is the second taste-sensation to be numbed and saltiness the last which is, indeed, very persistent. So far, I have not succeeded in finding a local anaesthetic that is of even the slightest use in aiding the isolation of the taste for 'sweetness', though this would appear to be a valuable line of research for *a specialist* in biochemistry.

I can scarcely give adequate thanks to Mr. Spiegelhalder for the time and trouble he took during his busy duties in applying his exceptional tasting-ability to the problem in hand, without recompense or any hope of glory but with a possible argument to defend in years to come.

Note:

" 'Tis with our judgments as our watches, none
Go just alike, but each believes his own."

TABLE I

SOME PUBLISHED ORDERS OF "SWEETNESS OF SUGARS".

with *Sucrose* as Standard = 100

Sugar	At Minimum Concentration or 'disappearing point'[1]	Between 2% and 50% Concentration[2]									Other Figures				
		2%	5%	10%	15%	20%	25%	30%	40%	50%	3	4	5	6	7
Levulose	173.3		111.1	114.9	117.2	119.8					175.0	103.0-150.0			
Dextrose	74.3	62.5	69.4	78.7	87.2	91.7	90.9	95.2	100.0	100.0	66.0	50.4	40.0	50.0-60.0 60.0	52.0
Maltose	32.5		35.7	47.4	54.5	56.5									
Lactose	15.0	33.3	38.2	48.3	54.0	60.1									
Galactose	32.1													27.0-28.0	
Raffinose	22.6														
Rhamnose	32.5														
Corn Syrup		28.5	31.8	39.8	45.0	47.3	49.0	54.5			30.0				26.0

[1] 'Carbohydrate Studies' ('Relative Sweetness of Pure Sugars')—Alice Biester, Mildred Weigley Wood & Cecile Stone Wahlin, Div. of Home Economics, Univ. of Minnesota, April 24, 1925.

[2] 'The Relative Sweetness of Sugars as Affected by Concentration'—A. C. Dahlberg & E. S. Penczek, N. Y. State Agricultural Experiment Station, April 1941.

[3] 'How One Sugar Compares with Another'—Stroud Jordan. Food Industries, March, 1940.

[4] 'International Critical Tables'.

[5] U. S. Department of Agriculture, Farmers Bulletin 535, 1913—M. H. Abel.

[6] Journal Industrial Engineering Chemistry, XIV, 522, 1922—J. W. Sale and W. W. Skinner.

[7] Chem. Zeit. XLV, 705, 1921—T. Paul.

TABLE II

RELATIVE SWEETNESS OF SOME SUGAR SOLUTIONS.

WITH LEVULOSE AS STANDARD = 100

(Whymper and Spiegelhalder)

SUGAR	Percentage concentration of sugar solids in water.						
	2%	5%	10%	20%	25%	30%	40%
Sucrose	66.6	72.0	80.0	85.7	91.0	100.0	100.0
Dextrose	50.0	54.0	60.0	71.4	73.5	77.0	83.7
Invert	80.0	80.0	80.0	85.3	92.5	100.0	100.0
Corn Syrup	25.0	25.0	25.0	28.5	33.0	36.4	36.4
Invert + Sucrose (60:40)	75.0	...	80.0	85.7	93.0	100.0	100.0

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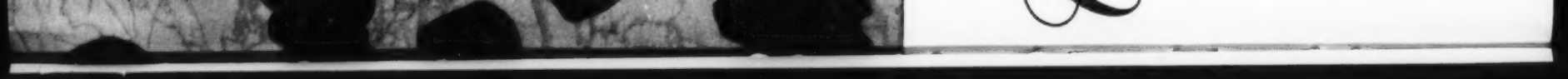

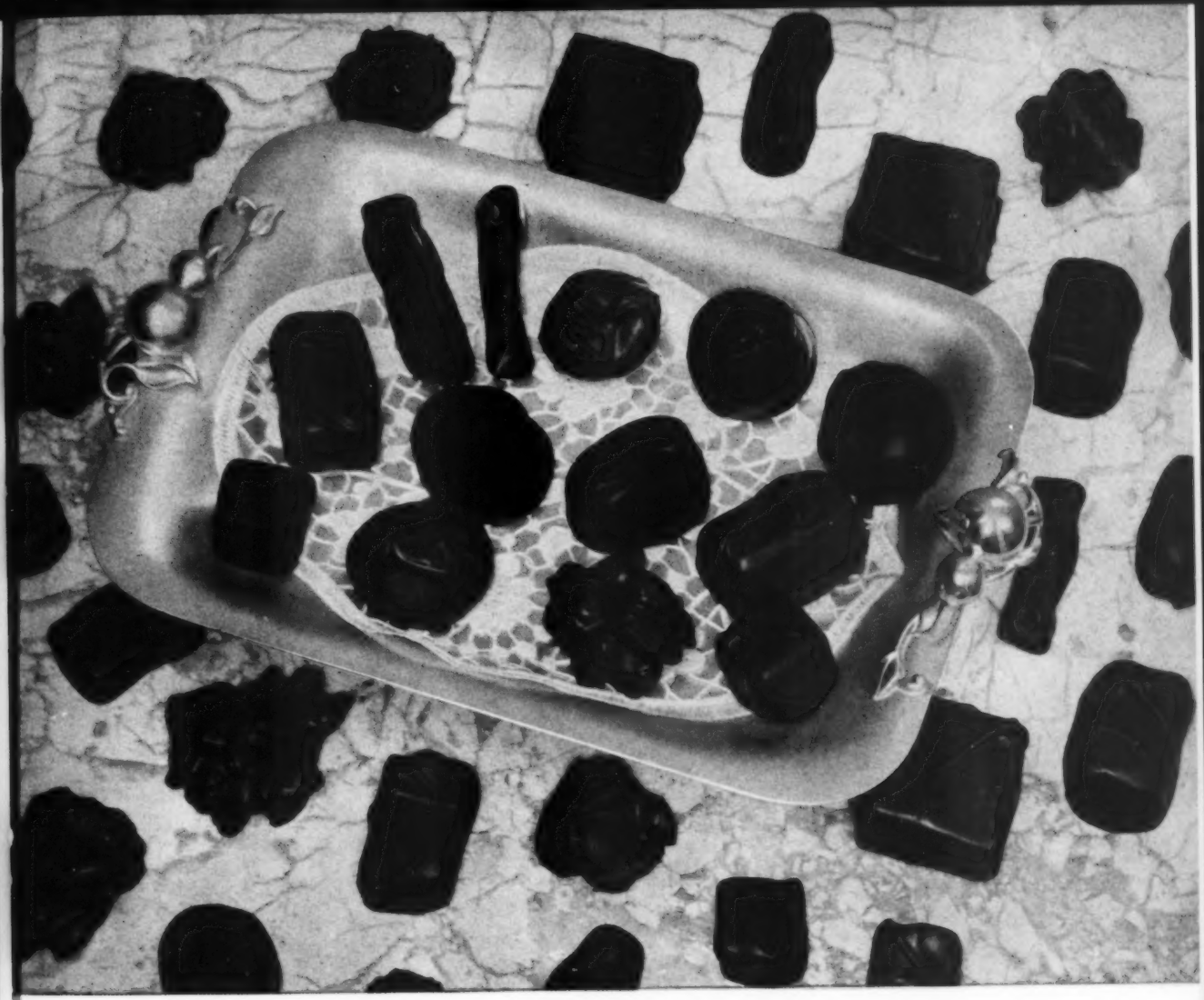

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Proceedings of the Eighth PMCA Production Conference

It has become traditional with the Production Conference of the Pennsylvania Manufacturing Confectioner's Association that each succeeding conference be bigger and better than the one before. The ninth annual conference held this year was no exception. The attendance was the largest ever, almost three hundred. The percentage of attendees from candy and chocolate manufacturers was also the highest ever, over sixty percent. There were also the usual attendance from abroad. The Canadian delegation was over a dozen, from several different companies. Others came from Egypt and Germany.

As has been our custom, this issue of The Manufacturing Confectioner brings you as complete a record of the proceedings of this conference as is possible within the limits of one issue. Many of the talks are given in full. Others, not less important, have been condensed by our editors, making use of the author's words wherever possible. Brevity has been combined with clarity in these shortened talks – no mean accomplishment.

The candy and chocolate manufacturers listed at the top of this page each sent from one to five men to this conference. The list includes practically every candy company of any size, making this conference by far the most important technical meeting of the industry in this country. The advance information of the tenth conference scheduled for April 26 and 27 next year promises a continuation of the above mentioned tradition.

Flavor Pattern and Flavor Profile, *L. C. Cartwright, Foster D. Snell, Inc.*

In the case of foods, flavor implies total sensory response to the material taken by mouth. This includes not only actual taste sensations but also tactile response (mouth feel), olfactory response and pain. Inclusion of pain may be a surprise but it is an essential part of certain desirable flavor complexes. Most of us can sense and distinguish thousands of different aromas and flavors. Some we like and some we don't. Each of us has his own likes and dislikes. Thus we have flavor patterns. Many different kinds of food acceptance patterns may be considered such as national, regional, ethnic, cultural, family and individual. Much is already known of these patterns. We can organize and use our knowledge to investigate new areas.

The expression, "flavor profile," means what the words imply. The aromas and flavors of most foods are quite complex, being composed of many different odors, tastes and other factors affecting sensory response, at various levels of strength. It is the total impact of all of these factors together which determines whether we like a particular food product, or like one better than another.

In food formulation, improvement, quality control and acceptance testing, it is essential to be able to determine not only that two samples differ in flavor, but exactly how they differ. This is most effectively done by the profile method. In principle, the flavor profile is quite simple. It is merely a quantitative expression of the intensities of each of the individual notes that make up the total flavor complex of the product. These are expressed in names or descriptive words for each of the individual notes, and numbers indicating the relative strengths of each note on some suitable scale. Such results can be plotted or graphed. The term "flavor profile" originated from such graphs.

The concept is simple but the determination of flavor profile is not. It is the most complex of the several methods for evaluation of flavor but it provides the key to the study of patterns of flavor acceptance, and the development of food products which will achieve maximum commercial success through optimum consumer acceptance in the markets to which they are offered. In developing the flavor profile of a product, first its flavor must be carefully analysed by trained palates to determine what notes are present. This analysis is usually done independently by at least three experts, carefully trained in profile work. Then they work together, comparing notes and finally arrive at a consensus as to what notes are present and how they should be described. Next, the relative strengths of the single notes must be determined. This is done by a panel, consisting of five or six persons selected for sensory acuity and trained in profile evaluation. A trained expert may be good at evaluating certain products but may have a "blind spot" for certain others. Often two or more samples are evaluated concurrently. Whenever possible, a physical reference standard (with an established profile) should be made available to panel members.

Working independently in individual booths in an air-conditioned sensory panel room, each panel member carefully tastes each sample and studies its flavor complex according to his training and experience, and, on a prepared score sheet, containing the names of the flavor notes previously established for that product, records the strength of each flavor notes. This procedure is repeated at least once, usually twice. After each session, the panel members compare notes. Final agreement may be reached through a conference.

Various scales have been used to numerically represent the note strengths in flavor profiles. The usual practice is to let zero be the complete absence of a note, umity its presence at a barely detectable level and four the maximum intensity. Intermediate values may be designated in tenths or fractions.

The flavor profile determination is far from an exact science. Yet it has been of inestimable value in guiding the formulation of new food products, in matching flavors, in trouble shooting, comparative evaluation of products, and even in predicting relative consumer acceptance of products. For the widest possible consumer acceptance, a food must be formulated not so much so that the largest possible number of people will like it strongly as that the smallest possible number will have any strong dislike for it. Specialty food products with distinctive flavors, appealing to a limited market, can be quite successful, if properly formulated to fit the flavor acceptance pattern of the special market. Any producer of foods can greatly improve his competitive position by giving careful consideration to the flavor acceptance patterns of his present and potential market and tailoring his products to those patterns. The trained sensory panel is an effecive tool for studying these patterns through application of the profile method of flavor analysis.

Report on Research in the Candy Industry, *Dr. S. M. Cantor, Sidney M. Cantor Associates.*

A survey on current research in the confectionery industry was conducted as a first step to ascertain the research needs of the industry. Five broad questions were asked: (1 and 2) policy regarding publication of research results, (3) sponsorship of research, (4) number of people active in research, (5) estimate of research needs in the industry, and (6) any additional remarks.

The returns indicated that:

Most of the research work being conducted is of an applied type. More applied research is desired and also fundamental research as well, particularly on a cooperative basis. The questionnaire did not properly assess the research objectives of the confectionery industry. Perhaps, management did not consider such items as market research, consumer reaction studies, packaging research, package design—complicated factors which enter into the production and marketing of a consumer product in today's competitive markets.

Research activities in the industry are at very low level. That there is a great need for improvement of this situation, that much can be done on a cooperative basis, and that the field is wide open are obvious conclusions. It would seem best to confine cooperative activity to basic studies, the result of which can

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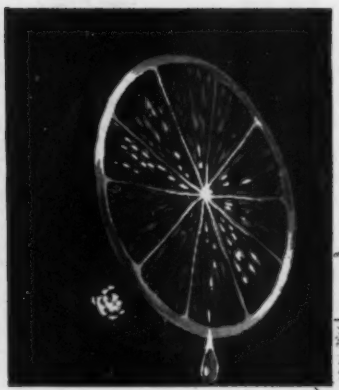

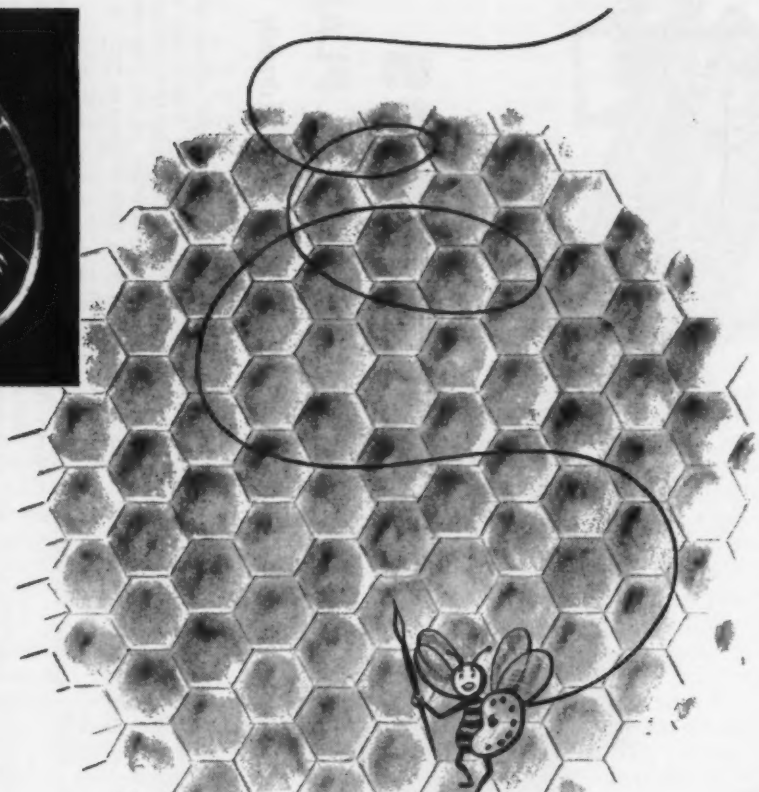

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be applied at the discretion of the participants, and to carry on internally those applied projects which fit individual objectives and show best signs of being concluded successfully.

The planning aspects of a research program which serve to define the problems cannot be overestimated. Oftentimes proper definition of the problem is more than half the project.

Preparation of Centers for Enrober Coating, *Clifford Clay.*

A formula should be devised so that the center will not sweat thereby allowing the chocolate to peel off. Centers must not break down when warm chocolate covers them nor expand and split the coating. Centers must not be oily so that chocolate gets soft or smears. Sucrose and non-crystallizable sugars must be balanced so that the centers will be stable and not fall in and have hollow bottoms. High free moisture content causes sugar or fat bloom, and must be avoided.

The moisture in the center, that in the starch and that in the surrounding air should be so balanced that a predetermined quantity of moisture will leave the center and leave it with a thin dry skin to protect it from sticking during transit to and storage in the center room. Few centers benefit by lying in starch over 24 hours. The predetermined time will be affected by more than the composition—the type, the size, and atmospheric condition. Each type of candy will have its best time but should have a tolerance of from 2 to 4 hours.

It is possible to keep good grade creams, caramels or marshmallows in starch from Thursday to Monday, if proper precautions are taken. The addition of a humectant is safe. The starch room should be cooled to 50 or 55 degrees and the humidity allowed to rise as the temperature falls.

The center store is best located directly behind the covering machines or above the feed tables. Starch trays storage is best. A sheet of wax paper laid over each tray in close contact with the centers will provide sufficient protection against drying out for periods up to 48 hours.

Three conditioning rooms are best: one with a 50 F. and 50% R.H. for soft centers (when they are to be used, they must be moved to a warmer section); one at 70 F. and low R.H. (dry) for hard candy; and one at 70 F. and 50 to 60% R.H. for centers which must not dry out.

Running cold centers may well cause delayed bloom. Hot centers must be cooled before the chocolate can set and if the coating does not bloom it is almost certain to lose any markings put on it, to foot out at the bottom and certainly to lose gloss.

Melted untempered or partly tempered chocolate should never come in contact with surfaces below 70 F., probably 72 F. is better, until such time as the chocolate has lost its "wet" look. The center room should deliver centers to the covering machines at 70 F. or very close to it. The humidity should suit the centers. The skin must not be dissolved nor must the center dry out.

Common Errors Made by Candy Makers, *J. A. King, Nulomoline Division, American Molasses Co.*

Consistently repeated errors may be the responsibility of management's failure to have information regarding three important job aspects, (1) selection of employees, (2) equipment design, and (3) working conditions. Certainly by using the psychologic technique of finding out what kind of abilities, and how much of each, a job applicant has, management will be able to eliminate to a large degree errors in production resulting from the hiring of persons not competent to perform a particular task.

It is wasteful and costly not to have equipment that workers can use with a maximum of efficiency and a minimum of errors; errors that have been due not to the operator's lack of ability, but to the confusing and poor arrangement of equipment. It is indeed foolish for us to waste valuable energy, and suffer needless repeated errors, simply because we give our workers too frequent or infrequent rest periods, too much or too little light, too hot or too cool a room in which to work. It is not only a matter of consideration of the comfort of the worker to manipulate these variables as efficiently as possible, but it is also a matter of savings of time and cost to management.

One of the earliest advances leading to the reduction of errors on the part of the candy maker, was the introduction of measuring, weighing and temperature control apparatus. A major error today is failure of management to supply measured amount of flavors and colors to the candy maker. The tendency to guess at the amount of water required to dissolve the granulated sugar for a candy batch is also a common error.

Mr. King cited common errors or mistakes and listed numerous precautions in the processing of Cast and Rolled Cream Centers, Cream-Fondant Bon Bon Coating, Chewing Candies, Coconut Candies, Fudge, Jellies and Gums.

The practical and technical operator is well aware that the ability to duplicate the desired characteristics of candy start with the availability and proper use of uniform ingredients, accurate measuring utensils, frequently checked weighing apparatus, easy to read and periodically tested temperature control and recording instruments, the controlled application of heat, efficient and flexible mixing, beating and cooling equipment, and a generous supply of auxiliary utensils in which to weigh and handle ingredients, plus sanitary working conditions and the necessary know-how.

The Kit of Tools for Cost Control, *Dr. G. J. Anyon, University of Pennsylvania.*

With the accounting conventions and statements the income and expense by types of accounts, regardless of product or department involved, is accumulated to reflect the overall balance. The P & L statement shows the expenses assignable tot he current period. The balance sheet records the assets and liabilities applicable to future periods. These accounts give what is actual, what has been committed, and what is done. Supplementation is necessary.

The basically new addition is the predetermination of values to be the basis for prediction. A second addition is the ingredient of information and data in records needed for the comparison of predictions and experience, in terms of the predeterminations involved. The first step in the control process involves research, study and judgement to create a point of reference or a plan to act as a guide. The second step is the inspection to check whether performance matches the potential set in the first step. The third step involves making the adjustment necessary to correct the variance between potential and reality (steps one and two).

The history of business failures indicates that at least sixty percent of the debacles are assignable to managerial incompetence. This is manifested in an inability to foresee and to avoid those conditions which eventually became the cause of failure. Managerial standards and systems covers activities involved in standardizing operating conditions and establishing related performance allowances. Operating standards usually involve six basic elements: (1) material standardization in terms of product specifications, (2) equipment to be used and its efficiency, (3) working conditions, (4) procedures followed reflect performance expected, (5) the maintenance of a soundly designed organization, and (6) forecasting what is likely to happen, research to determine what should happen, data collection to show what has happened and systems of reporting to summarize the picture to guide performance.

When these elements are established, standards of performance can be made. These are convertible to material budgets and bills of material. These are the basis for computing labor costs, on a company, product and individual operator basis.

Performance standards can be applied to estimating, pricing, master scheduling, manning of work stations, machine loading and balancing of capacity. They can be used in the development of inventory control points.

The standardization of operating conditions is achieved in such managerial disciplines as Operational Analysis, Methods Study and Work Simplification Programs. The creation of performance standards is accomplished in such disciplines as Time and Duty Studies, Motion and Time Studies, Work Sampling and Pre-determined Time Value Systems. Production planning and control, material control and procurement, wage administration, pricing and sales control are some of the managerial techniques, devices and systems and procedures that need the same basic data sketchily mentioned in the budgetary control system. The managerial bundle of techniques needs these basic tools that establish the standardization of operating conditions and the related performance standards.

Extruding Machines: The Friend Hand Roll Machine, *A. D. McCulloch.*

Briefly, the machine operates on the simple basis of placing the material to be formed in the cream chamber, exerting a slight push on the top of the batch and then releasing it. The desired amount of material is extruded through each of the many orifices

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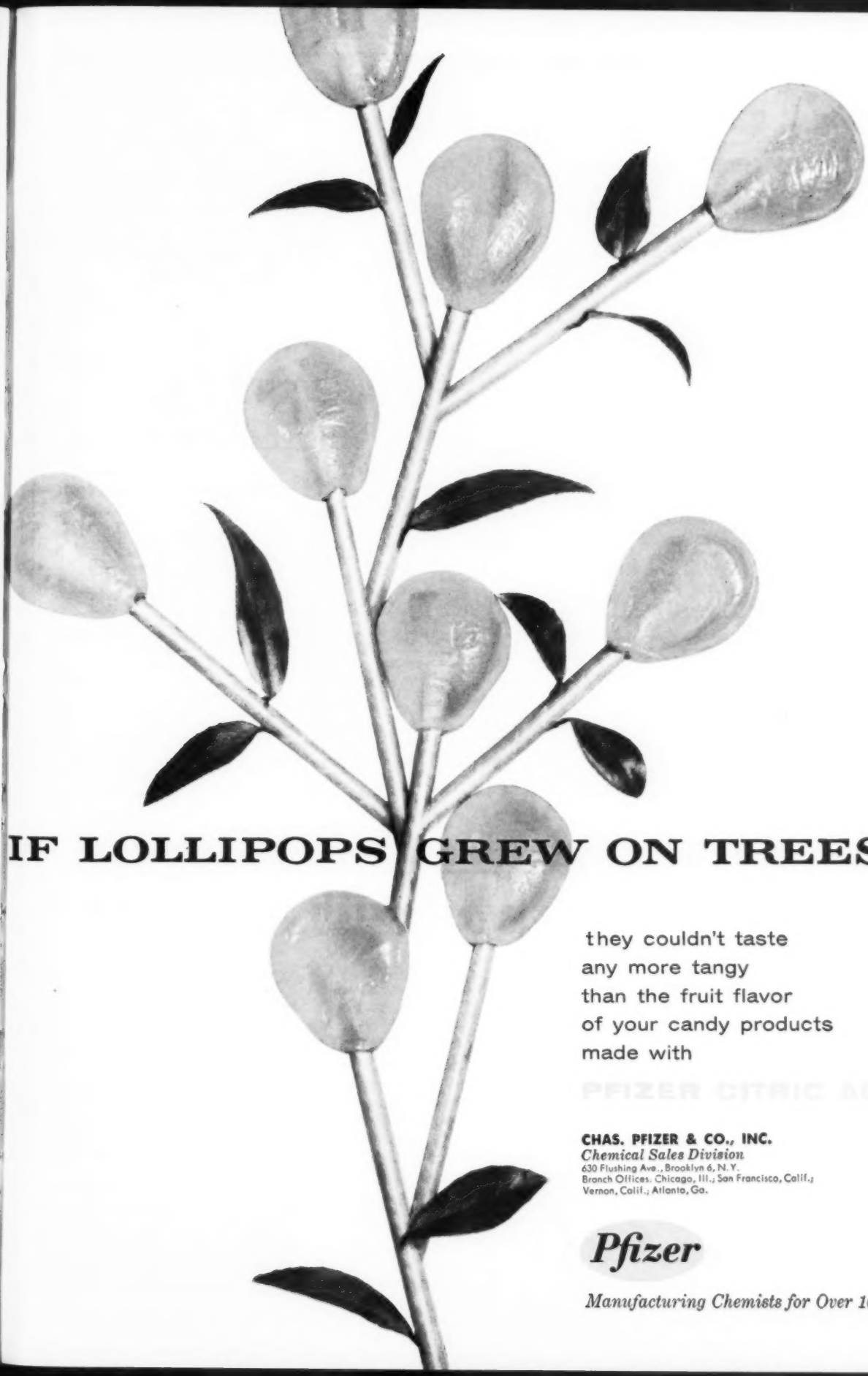

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in the die plate directly beneath the batch. The receiving tray, which has already risen to the height of the piece, is lowered simultaneously with the cutoff, thus forming the finished center. The machine and its principle are simplicity itself. All models are constructed of cast aluminum alloy, bronze alloy, and steel; the steel with a rust preventive Parkerize coating.

Once the cream is deposited in the chamber, no further agitation or working takes place and all centers formed will have the same weight per volume or density. The machine is versatile: centers of varying sizes and shapes being made by rapid and economic changeover. The centers have rounded sides and flat bottoms, a geometric design free of weak spots which could start leaks after coating. Forming costs can be as little as 1/3¢ per pound.

Because the Friend machine deposits a large number of centers on each board, it is necessary that the material be of relatively the same consistency throughout the batch. Candy personnel should follow a standard procedure in the preparation of the material to be deposited. Perhaps the most important factor in the preparation of material is the control of temperature during every step to its completion. Steps where temperature is the major factor are: Cook, Creaming, Forming, and Conditioning. Audible signals or visual meters to alert personnel may assist in obtaining good temperature control.

Cooling Tunnels, *A. T. Newth, The Nestle Co., Inc.*

Because of the longer travel in a Multi-tier cooler, air temperatures can and should be higher than those in tunnels. The speaker's preference is 60 to 65 F. with as low relative humidity as possible.

A temperature no lower than 52 F. and a R.H. of 55% or lower is preferred for straight run tunnels. Air temperature under the belt at the enrober end should be no higher than 45 F. to 50.

The disadvantages of the Multi-tier as against a tunnel are four: cost, upkeep, difficulty of cleaning the unit, and the transfer of goods from the enrober wire belt to the Multi-tier plaque which is difficult for miniatures because of the gap between the detailer and plaque.

When one considers that it takes at least 2 hours at 65 F. to do a good cooling job on chocolate coating, the longest tunnel and the longest travel will be the best for both of these units. Most of the cooling done is mere compromise: the entire dipping procedure must be correlated for the best results. The air flow in both these units should be so baffled that it does not strike the wet, freshly dipped centers for approximately two minutes. This permits a setting film to form in which most of the sensible heat has been given off. This is the first point at which air should be permitted to strike the goods. The air should be 65 F. or higher. As the goods progress through the tunnel, more air at lower temperatures is indicated and beneficial.

The packing room should be maintained at 65 to 68 F. at 55% R.H. or lower. The relative humidity in the packing and storage rooms is more critical than in the enrobing units.

Temperatures and relative humidities should be controlled for the storage of chocolates. Desirable conditions are 65 to 68 F. and a maximum R.H. of 55%.

"Cocoon" Plastics and their Use in Plant Mainteance, *R. R. Tisdall, R. M. Hollingshead Corp.*

"Cocoon," a plastic material was a war-time development and became widely known because of "Operations Mothball." It has the ability to form a web across a gap as wide as 20 inches without support and has the strength to permit a buildup of material on that webbing instantly. It is a homogeneous material, forms a continuous surface, and is resistant to fungi. Films may be of the strippable or non-strippable type. Application is best when sprayed. The cost is believed economical. Possible application in the confectionery industry includes: protection of outside of buildings against further deterioration by waterproofing; protection of inside walls against moisture penetration; elimination of ceiling paint loosening and droppng into candy batch; as a wall-coating enabling easier cleaning; sealing of holes of various types; use of a strippable film on work benches; the sealing of irregular surfaces; the coating of all piping; and the coating of machinery and equipment used for mixing candy to eliminate the necessity of scraping residual candy from mixer when done. "Cocoon" plastic has proved effective in sealing plants against loss of gases used in pest control.

Confection manufacturers recognize that they get out of their product only what they put into it. Skillful manufacture, proven raw materials, and good formulas are a necessity today.

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Three talks were given at this production conference on the subject of high conversion corn syrup. We felt that they gave a most complete review of the knowledge of this important raw material for candy, and are therefore printing them in their entirety. The article beginning on this page deals with the physical and chemical characteristics of this product. The one that follows describes the advantages of using high conversion syrup, and the third of the series recounts some disadvantages found in the use of it in some types of candies.

Physical and Chemical characteristics of enzyme converted syrup

by JOHN A. KOOREMAN, *Penick & Ford, Ltd., Inc.*

To simplify the presentation of physical and chemical data and to facilitate comprehension of significant values relating to enzyme converted corn syrup requires comparison with more conventional and better known types. A total of three types will be considered and referred to in the interest of brevity, as

1. "Regular", which is the familiar 42 D.E. type described in the trade for years as "Confectioners Glucose".
2. "Intermediate", a less well known, but still a widely used grade of D.E. range 50-54.
3. "Enzyme Converted", which is the principal subject of this discussion.

In the manufacture of corn syrups, each has a common starting point. Thoroughly washed, highly refined corn starch, freshly extracted from its natural source is slurried with water at a concentration of around three pounds per gallon. The suspension is treated with hydrochloric acid so that the pH is about 1.7 and then pumped to a converter where it is subjected to direct steam under pressure for a period of time. At this point procedures diverge temporarily; the regular type may be terminated after an 8 minute "cook"; intermediate after 10 minutes and enzyme 5 to 12 minutes. The conversion liquors so formed are neutralized with sodium carbonate, skimmed, treated with filter aid, filtered to remove insoluble non-colloidal matter, and subjected to decolorizing treatment with activated carbon. Regular and intermediate grades are then concentrated in triple effect evaporators to the baume at which they are sold. "Enzyme Converted" is evaporated to about 30 baume. It is pumped to holding tanks and charged with an enzyme solution, having diastase and maltase activity. For a period of about 48 hours the conversion liquor is gently agitated and maintained at a temperature of approximately 125° F. It is then brought to a temperature of 170° F. for 10 or 15 minutes which serves to inactivate the enzyme and terminates any further hydrolysis. A second decolorizing treatment is applied, followed by concentration to commercial baumes.

The production of corn syrups involves both mechanical and chemical operations. Processes leading up to extraction and purification of the starch are largely mechanical. When the starch is then subjected to the conditions previously described, production techniques are influenced principally by chemical reactions. Starch is a carbohydrate of the general formula $(C_6 H_{12} O_5)n$. In the conversion step it is partially hydrolyzed to a series of lower molecular weight

compounds ranging from the simple mono-saccharide, dextrose $C_6H_{12}O_6$, through di, tri, and polysaccharides up to, but just short of, starch itself. It is generally assumed that a great number of starch hydrolyzates are present which have never been isolated and identified. However, certain fractions have been quite definitely ascertained. This permits classification of corn syrups according to composition which largely dictates to what end uses that may be most effectively applied. These fractions are dextrose, maltose, dextrines and higher sugars. The dextrine and higher sugar groupings embrace those hydrolyzates of which little is known concerning molecular structure.

From the standpoint of practical manufacturing, the composition is controlled by timing the exposure of the starch slurry to acidic or enzymatic catalyzing action. If 42 D.E. "Regular" is being made, perhaps an 8 minute treatment in the converter is in order; for "Intermediate" perhaps 10 minutes. The concentration of dextrose and maltose is directly proportional, and the concentration of dextrins and higher sugars is inversely proportional to the time of substrate exposure to converter conditions.

Up until less than 20 years ago it was impossible to manufacture an acceptable corn syrup in a D.E. range above that of "Intermediate" grade by conventional acid conversion methods. Attempts to do so resulted in the development of an objectionably bitter flavor, referred to in the trade as "hydrol flavor". This was apparently due to the formation of dextrose reversion products after relatively prolonged contact between dextrose and its highly acid medium at elevated temperatures.

In 1938 Dale and Langlois observed that if starch were converted by a combination acid-enzyme method, it would be possible to manufacture a syrup containing a high level of reducing sugars, corresponding to a dextrose equivalent of 60-65, without undesirable formation of flavor influencing dextrose reversion products. Moreover, the ratio of dextrose, maltose, higher sugars and dextrine were markedly different which enabled concentration to conventional baumes without danger of crystallization. Thus, enzyme converted corn syrups were "born".

According to current theory, the following chemical reactions occur during starch hydrolysis under conditions imposed by conventional corn syrup manufacturing practices:

ACID CONVERSION

$(C_6H_{10}O_5)n$ Starch	(Acid)	$(C_6H_{10}O_5)n$ Dextrine	
$(C_6H_{10}O_5)n$ Dextrine	(Acid)	$(C_6H_{10}O_5)n$ Higher Sugars	
$(C_6H_{10}O_5)n$ Higher Sugars	(H_2O)	$(C_{12}H_{22}O_{11}H_2O)$ Maltose	$+ C_6H_{12}O_6$ Dextrose

ENZYME CONVERSION

$(C_6H_{10}O_5)n$ Dextrine	(Diastase)	$(C_6H_{10}O_5)n$ Higher Sugars	$+ C_{12}H_{22}O_{11}H_2O$ Maltose
$C_{12}H_{22}O_{11}H_2O$ Maltose	(Maltase)	$2\,C_6H_{12}O_6$ Dextrose	

These principal reactions give rise to the following average quantitative analyses relating to the carbohydrate fractions: (1)

	Regular 42 D.E.	Intermediate 53 D.E.	Enzyme Converted 63 D.E.
Dextrose, % Dry Basis	21.8	32.6	37.5
Maltose, % Dry Basis	20.8	26.4	34.2
Higher Sugars, % Dry Basis	20.4	13.0	16.1
Dextrine, % Dry Basis	37.0	28.0	12.2

It should be noted that "Enzyme Converted" is appreciably higher in dextrose and maltose and correspondingly lower in dextrine and the so-called "higher sugars". Herein lies the reason for its unusual properties which will be summarized.

1. Sweetness: It is generally understood that both dextrose and maltose have characteristic sweetener values of the approximate order 0.75 and 0.4 respectively as compared to sucrose. Higher sugars are of less intensity and dextrines possess no sweetness. Consequently, the sweetness level of a corn syrup is directly proportional to the concentration of reducing sugars (such as dextrose and maltose) and inversely proportioned to the concentration of dextrines. A numerical relationship expressing approximate sweetness may be derived from the total dry basis sums of dextrose and maltose which amount to 43 for "Regular", 59 for "Intermediate" and 72 for "Enzyme Converted". On this basis "Enzyme" calculates almost twice as sweet as "Regular", which is, in fact, the case when evaluated per se.
2. Hygroscopicity: In the case of corn syrup, this term is defined as the ability to adsorb and retain moisture. It is of interest to the candy manufacturers because of the vital relationship between moisture and its effect on the tenderness and keeping qualities of confections. "Enzyme Converted" is the most effective of all three types, again, due to the high ratio of its hygroscopic components, dextrose and maltose. Adsorption and desorption equilibrium values are set forth in the following table: (2)

% WATER ON DRY SUBSTANCE BASIS 25–30° C

RELATIVE HUMIDITY %	REGULAR	INTERMEDIATE	ENZYME CONVERTED
ADSORPTION			
35	7.69	8.57	8.85
45	9.61	10.97	11.77
52	11.88	13.53	13.75
66	16.81	19.10	19.22
DESORPTION			
35	7.50	8.62	9.00
45	9.54	11.02	12.02
52	11.79	13.57	13.91
66	16.75	19.21	19.40

The foregoing data indicate that "Enzyme Converted" is the most efficient medium of the three materials under consideration for contributing to moisture stability within normal ranges of humidifying and dehumidifying atmospheric conditions.

3. Viscosity: The subject of viscosity is signifi-

cant because it has to do with the ease of handling the raw materials, and the manner in which it manifests an effect on both production and eating characteristics of candies. For example, the whipping time of a marshmallow batch; the tenderness, toughness or chewiness of a caramel; the solubility rate of hard candies, are all influenced by the viscosity of their respective ingredients.

So far as corn syrups are concerned, their viscosities are contingent upon temperature, baume, and dextrose equivalent. With respect to the latter, theoretical considerations reveal that the molecular size of such fractions as dextrines and higher sugars has a bearing on their resistance to an externally applied force. Consequently, the more of these that are present, the lower the dextrose equivalent the greater the resistance to flow, which is reflected in the term "viscosity".

Baume is an expression used to describe the density of a syrup. It is a function of the percentage of dry substance, and thus is related to viscosity because a diluted syrup is more fluid than a concentrated one. Viscosity varies inversely with temperature. From a practical standpoint, temperature features are most important because they may be readily adjusted so as to modify viscosities commensurate with the demands of storage, pumping, distribution and metering equipment. All of these factors are numerically illustrated in the following tables:

APPROXIMATE VISCOSITY OF CORN SYRUP IN CENTIPOISES @ 43° BAUME

TEMPERATURE °F.	REGULAR	INTERMEDIATE	ENZYME CONVERTED
60	300,000	200,000	160,000
80	59,700	41,000	30,000
100	14,800	10,000	5,800
120	4,600	3,100	1,800
140	1,800	1,200	720

The above table points out viscosity characteristics under one constant and two variable conditions. Forty three baume is selected as the constant because it is the most commonly used in commercial practice. The D.E. is a variable factor in keeping with established classification of corn syrups; to complete the objective of the schedule, various temperatures are shown.

Since corn syrups contain fermentable sugars, they resist microbiological activity only in a concentrated state. For that reason they are generally sold in a baume range of 41° to 45°, with by far the greatest demand for the 43° baume type, as previously stated. It is of interest however, to observe viscosities at various baumes at a constant temperature.

APPROXIMATE VISCOSITY OF CORN SYRUPS IN CENTIPOISES @ 100° F.

BAUME	REGULAR	INTERMEDIATE	ENZYME CONVERTED
41°	2,500	1,600	1,100
42°	8,000	5,200	2,000
43°	14,000	10,000	5,800
44°	39,000	26,300	14,000
45°	140,000	80,000	41,500

It seems desirable to enlarge somewhat further on the meaning of baume so as to point out the apparent reason for viscosity differences, which in effect, is one of moisture content. (3)

MOISTURE CONTENT OF CORN SYRUP %

BAUME	REGULAR	INTERMEDIATE	ENZYME CONVERTED
41°	23.66	23.05	22.41
42°	21.70	21.06	20.41
43°	19.73	19.06	18.38
44°	17.75	17.04	16.33
45°	15.75	15.02	14.28

It will be observed that as the dextrose equivalent of a corn syrup increases from "regular" through "Intermediate" and up to "Enzyme Converted" types, the percentage of water present at a given baume decreases; conversely, the percentage of solids increases. In other words, there is more soluble matter present, and this may be explained by reference to an earlier table where it was shown that in the higher D.E. ranges there is a greater proportion of relatively small molecular size and low molecular weight carbohydrates such as dextrose and maltose. It requires more of these to create the same buoyant effect on an immersed spindle (which is the method employed for determination of baume) than it does of carbohydrates having greater molecular magnitude that are predominant in the "Regular" type.

The ratio of dextrose and maltose in corn syrups give rise to another phenomenon that is of both academic and practical interest. This has to do with the elevation of the boiling point. A common physical chemistry generalization states that the boiling point of a solution is a function of the concentration and molecular weight of the solute. When applied to corn syrups, the concentration of low molecular weight dextrose has a significant effect. For example, at a pressure of 29.92 inches of mercury (where water boils at 212° F.), a "Regular" type corn syrup of 80% dry substance boils at 226.3° F., "Intermediate"' at 228.9° F. and "Enzyme Converted" at 230.5° F. (4)

Thus, confections containing a high proportion of corn syrup should be cooked accordingly in order to arrive at the same level of total solids at the end point. Or, in other words, batches prepared with "Enzyme Converted" should be brought to a temperature of 4° to 6° higher than a similar batch prepared with "Regular".

A review of physical and chemical characteristics of "Enzyme Converted" corn syrup suggests its general function in candies. It serves as a crystallization inhibitor much like any other corn syrup. It is hygroscopic, tending towards greater moisture retention and prolonged shelf life. It is relatively fluid, which effects the texture and body of candies. Because of its low viscosity, it offers less resistance to agitation and whipping. Although sweeter than other types, per se, this quality is masked in the presence of sucrose and other adjuncts to the point where its use solely to increase overall sweetness is not recommended.

(1) C I R F Critical Data Tables
(2) J. E. Cleland and W. R. Fetzer—Ind. & Eng. Chem. Vol. 36, 552, June 1944
(3) Fauser, Cleland, Evans and Fetzer—Ind. & Eng. Chem. Anal. Ed. Vol. 15, 193, 1943
(4) Smith and Torgeson, Nat'l Bus. of Stds. (1950)

Advantages of high conversion corn syrup to the candy manufacturer

by F. HANLY BROCK, *A. E. Staley Manufacturing Company*

Starch Gums and Jellies

In Report No. 28 on "Progress in Candy Research" published in June, 1954, by the Southern Utilization Branch of the U.S.D.A. in cooperation with the National Confectioners' Association is a report of studies on the improvement of the texture of starch jelly candies. This report is summarized in part as follows: (Quote) The texture and keeping quality of starch jellies has been improved by formulation with high conversion corn syrup. Initial tenderness is significantly better, and its retention during storage provides about four times the storage life of regular gum candies containing 10% starch. (Unquote)

The report states that acid-enzyme high conversion corn syrup has given the most promising results obtained thus far in improving and stabilizing starch gum texture. The improvement is said to be highly significant and readily recognized by tasters as an improvement in the quality of the candies.

This report confirms our findings and experience with high conversion corn syrup in jelly candies during the sixteen years since this type of syrup became available. We have found the following advantages of high conversion corn syrup in candy gum work:

a. Batches made with high conversion syrup cook faster and deposit with less stringing because they are less viscous than batches made with other types of corn syrup.
b. Jelly candies made with high conversion syrup are more tender in texture, particularly after aging, than those made with other types of syrup.
c. Jelly candies made with high conversion corn syrup have a longer shelf life than those made with other types of syrup, first, because they retain their moisture better, and second, because even when much of their moisture is lost the viscosity of the syrup is low enough so that it does not impart excessive toughness.

Our experience, also, has demonstrated some limitations on the use of high conversion corn syrup in candy gum work:

a. The candies made with high conversion syrup lose moisture more slowly to the moulding starch than candies made with other syrups. Some candies, such as jelly bean centers, containing high proportions of this syrup may require more efficient drying conditions or longer drying in the starch moulds before they are ready for further processing.
b. The ratio of syrup to sugar that can be used without danger that the candy may sweat is somewhat lower than for other types of corn syrup. A ratio of 60 lbs. of high conversion syrup to 40 lbs. of sugar has been found most satisfactory.

Pectin Jellies

Although high conversion syrup is being used successfully in pectin jelly candies, we generally recommend regular conversion syrup in these candies. Pectin jellies usually contain a high proportion of invert sugar formed by action of the acid used to set the pectin. The combination of high conversion syrup and this invert sugar may make these candies sweat. Therefore, regular conversion syrup, which is less hygroscopic, is recommended.

Marshmallows

Marshmallows made with high conversion corn syrup have a much better moisture retention and a longer shelf life than similar marshmallows made with other types of corn syrup. Initial tenderness of marshmallows made with the various syrups is equal; but on aging, particularly when exposed to the air, those made with high conversion syrups stay fresh longer.

There are some limitations to the use of high conversion syrup in marshmallows. Too high a ratio of syrup to sugar may cause sweating, and marshmallows made with high conversion syrup dry more slowly in the starch molds than those made with other syrups. Marshmallows made with high conversion syrup may be sticky on the surface and may stick together after packing unless drying conditions or the length of drying time are adjusted to accomplish drying to the proper moisture level before the candies are packed.

Nougat

High conversion corn syrup improves the tenderness, moisture retention, and shelf life of short or grained nougat. Regular corn syrup is recommended for use in chewy nougat where its high viscosity is needed for adding a chewy texture.

Caramels

Because of the low viscosity of high conversion syrup, caramels made with this syrup cook faster, they can be deposited with less stringing, and the finished candies are shorter and more tender in texture than caramels made with other types of corn syrup. High conversion syrup gives best results in soft type caramels and in caramels to be coated. Regular conversion syrup is recommended where a firmer and more chewy texture is required.

Fudge

Comparative tests have shown that typical fresh fudge squares made with high conversion corn syrup lose approximately 20% less water during 96 hours of exposure to air of 66% relative humidity than fudge squares made similarly with regular corn syrup. The development of staleness in these candies corresponds with the rate of moisture loss. High conversion corn syrup, therefore, is recommended for retaining moisture and prolonging shelf life in fudge as in other soft candies.

Frappe

High conversion corn syrup is the only sweetener required for the production of light, stable, good flavored frappe. The viscosity and the moisture content of high conversion syrup are right for good whipping properties and stability without the necessity of boiling off water, and the sweetness of the syrup is right for good flavor. An excellent frappe is made by simply whipping albumen solution with part of the high conversion syrup at room temperature, heating the remaining syrup just to boiling, adding this to the whipped batch, and continuing the beating until the batch is light.

Fondant and Creams

High conversion corn syrup is recommended for use in the fondant, frappe, and bob portions of candy creams. It is not recommended to replace sugar in creams, but it does produce a shorter and more tender texture in creams than is obtained with the same proportion of other types of corn syrup.

Taffies and Kisses

Ordinarily high conversion syrup is not recommended for these candies. Regular conversion syrup is usually preferred, for it imparts a more chewy texture, more body, and drier surfaces with less tendency to stick to the wrappers.

Cocoanut Candies

High conversion corn syrup imparts a more tender texture and better moisture retention to cocoanut candies than are obtained with other corn syrups. It also imparts added sweetness and better flavor. If a pronounced chewy character or special resistance to softening in warm, humid weather are desired in these candies, the use of regular conversion syrup is indicated.

Hard Candies, Brittles, and Crunches

These are candies which should be kept low in moisture content, and ordinarily the use of high conversion syrup is not recommended for them.

High conversion corn syrup is most applicable in soft candies where prevention of moisture loss and the keeping of a soft, tender texture are desired. The lower viscosity of this syrup makes it easier to pump, pour, and handle; makes the candies cook faster, whip lighter, and deposit more easily; and produces shorter and more tender textures than are obtained with other corn syrups. The higher sweetness of this syrup contributes better flavor, especially in candies containing high proportions of syrup, as in frappe where high conversion syrup may be the only sweetener. The hygroscopic properties of this syrup make it more effective than other corn syrups for retarding loss of moisture from the finished candies and for extending their shelf life.

No one type of corn syrup is best for all candy making purposes. Regular corn syrup is the oldest and best known type, but intermediate and high conversion syrups are gradually becoming better known and more widely used. Their use can make many soft candies better and keep them good longer.

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Limitations found by actual experience in use of high conversion corn syrup in the candy industry

by JOHN M. KRNO, *Corn Products Sales Company*

Various formidable problems have arisen for the candy industry since it entered a new era of growth, stimulated by the Second World War. Those irking questions that lend themselves to possible solution by applying new, realistic concepts for management, marketing and advertising for instance, are not up for discussion at such a gathering as this one. At this conference, our aim is to find methods to overcome vexing, production barriers, whether these deal with equipment or ingredients.

The candy industry has a creative instinct and ability for solving these problems within its own boundaries and its own resources. In order that these can function at their best, the manufacturers of the machinery and raw materials used by the candy maker, must contribute the most complete, frankest and truest information in their possession pertaining to their own products.

A full description, perhaps stressing the merits of a piece of equipment or a new ingredient is not enough. Whether we are dealing with a flavor, a particular chocolate covering, a specially treated albumen, gelatin or starch or, as in this case, a sweetener, each product has inherent limitations.

Candy manufacturers produce a vast number of items differing widely in appearance, texture and taste effects. Characteristics of a raw material, which may drastically limit its use in any particular confection, may actually be an asset when used as an ingredient in another candy product. A limitation does not necessarily mean that a certain candy cannot be made with an ingredient having an adverse characteristic. Such a candy may need special production handling and perhaps wrapping. Often this may make its use uneconomical.

We are concerned at this time with sweeteners that are classified in the trade as high conversion corn syrups. This usually means that these syrups have a dextrose equivalent of 60 or over, which is on a dry basis. The most frequently used corn syrup by the confectioner is one whose dextrose equivalent is 42.0. Some others use a product having a D.E. of 50.0 to 55.0.

The first problem that confronts a confectioner when he considers the choice of using any of these three corn syrups is their handling. If the confectioner specializes in a few related lines, the problem does not exist. The selection is rather easy. The difficulty arises when the candy maker produces two or more of such candies as are exemplified under the terms—creams, gum work and marshmallows, and, at the same time, also makes hard candies, taffies and kisses. It can be solved, of course, by having two distributing systems for corn syrup in addition to one for liquid cane sugar; that is an ideal setup.

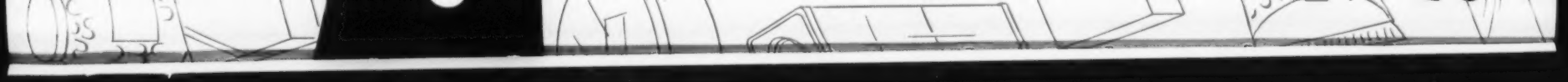
There are producers, who possess such equipment, but the majority depend on only one channel for handling corn syrup. He then has to handle the second by using it from a barrel or drum with the attendant greater labor that is involved. Sometimes, the confectioner, if he is using one of these syrups in a seasonal candy, which does not conflict with the remaining items of manufacture, resorts to close scheduling of his production and so with one distributing channel uses the preferred type of corn syrup in making each candy.

The amount of high conversion corn syrup that is being used in candy is gradually increasing, showing that the handling of it, in addition to the more frequently and generally used corn syrup of 42.0 D.E., is being overcome.

Perhaps the best way to point out the limitations as to usage in candies of the high conversion corn syrups is to consider the production of hard candies. These candies consist generally of carbohydrates, those belonging to the sweetener group, sucrose, invert, which in turn is a mixture of dextrose and levulose sugars, and corn syrup, which, itself, is a mixture of various carbohydrates and sugars such as maltose and dextrose. Other constituents are flavoring and coloring agents. These candies are solid solutions of these materials. Some classes of hard candies may be partially grained and sometimes aerated by pulling and hence are not clear candies.

Whether they are made by an open fire cook, by the use of vacuum cooking or a combination of both, these candies can either be straight sugar confections

(*Continued on page 88*)



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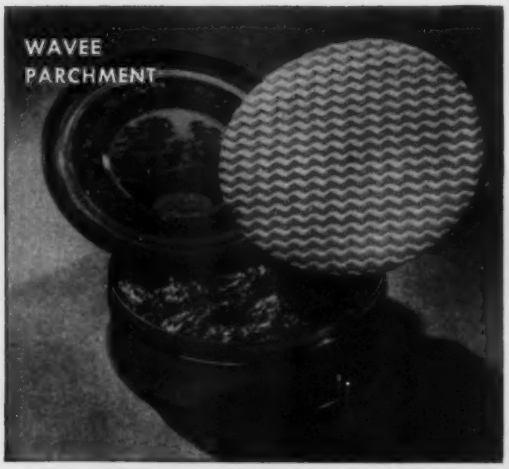

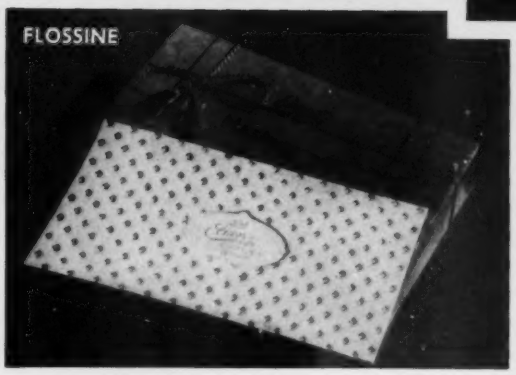

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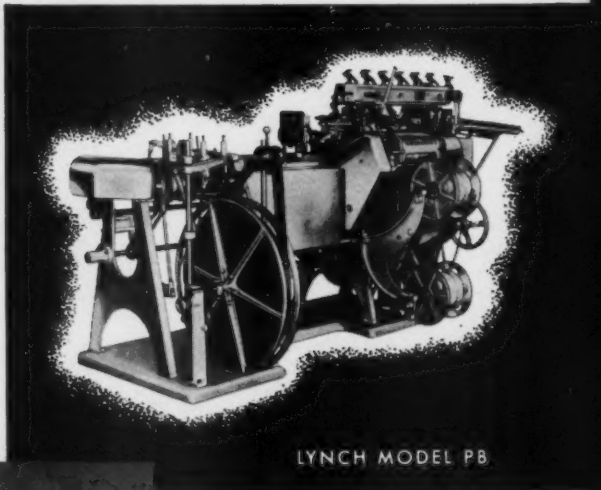

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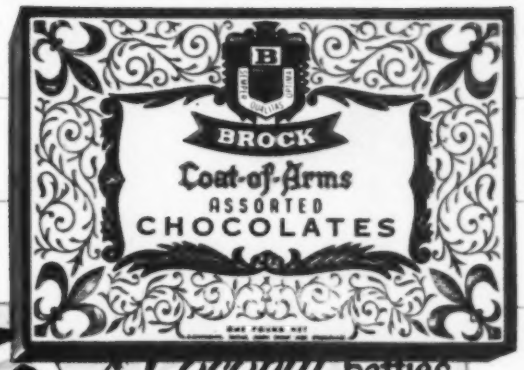

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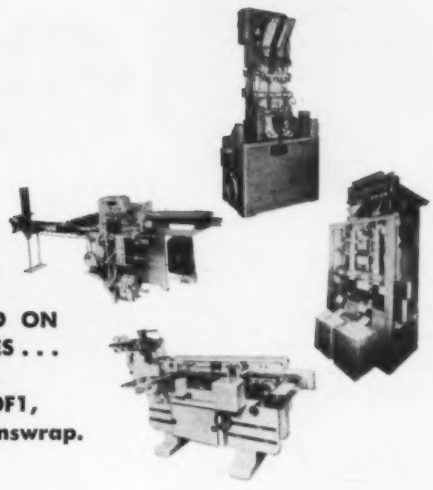

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Flexible packaging in the candy industy

by F. W. SPANNAGEL, *Sylvania Division, American Viscose Corp.*

My own experience has been confined to films in general and to cellophane in particular. Not being an expert on *all* flexible packaging materials, I had to enlist the aid of the principal manufacturers and converters serving your industry for pertinent information from whom I obtained quite a few suggestions as well as samples to illustrate my talk. Permit me to express my gratitude to those who willingly contributed data to this paper. Since much information has become available in the trade literature on package design and the decorative arts, I expect to touch on these phases rather lightly. Personally I have found comparatively little available information in the literature on the properties and characteristics of different flexible packaging materials in relation to package fabrication and performance. I do hope that some of my remarks will tend to fill this existing void.

Today we find in candy packaging some materials being used mainly for their decorative value or effect —others because of their functional values which they can give to the finished package because of their specific properties. Doubtless all of you are concerned with the quality of your products at the time of consumption—you would want it to remain as good as the day it left your plant. Proper use of flexible packaging materials often enables us to lengthen the shelf life of candy products under favorable storage conditions.

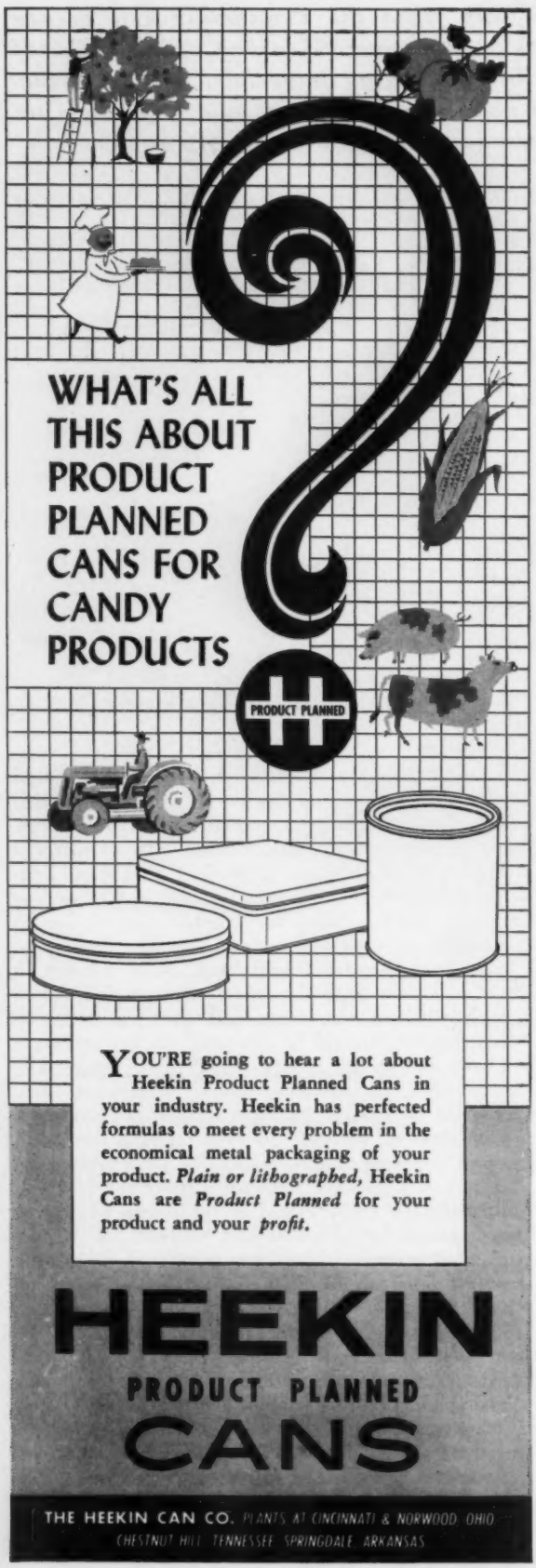
The development of a package and the selection of suitable packaging materials is indeed a joint venture on which different departments in your plant should cooperate.

To illustrate:

Your engineering or research department should decide on the type and degree of protection needed on the basis of the characteristics of your product. They should be consulted on what type of material will adequately protect your product; they should determine whether such material will withstand handling and will be best suited for graphic arts by any of the several printing processes.

Sales and Merchandising should have a voice in deciding on the type of package, its unit size—under consideration to marketing and distribution methods. Also, they should be consulted on the necessary art work and on the expected shelf life of your package. Further, consideration should be given to such factors as to whether its contents will be consumed at one time or whether an easy opening device or perhaps reclosing features should be incorporated. In deciding on a package form for a particular product, quite naturally conventional or traditional packaging styles should be reviewed and current competitive packaging practices should be considered. Often, too drastic a departure from an established package form, which the public will associate with a given product, will result in loss of product identity. Most likely you will wish to study cost estimates for various types of packages under consideration.

The Production Department knows best what types of machines are available and what new equipment would be needed to meet anticipated production requirements. They are charged with producing the package and are responsible for planning and maintaining efficient packaging lines. They will know what maximum spoilage of materials will be tolerable and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have experience on how different packaging materials will operate on their equipment. Also, they are familiar with the storage of your product.

Your Legal Department will know what factors should be incorporated in your design (e.g., product net weight, ingredient clauses, manufacturer's name and address, copyright registration, etc.). In short, the general requirements the law provides.

Purchasing is best in a position to advise on costs of materials, their availability and delivery schedules—in other words, they know the short and long term supply situation.

Last not least, your package material suppliers are usually in a position to answer questions on possible limitations of various materials, on the different characteristics of available materials and would know whether any existing materials can be modified to meet special requirements.

These are some very general considerations applying more or less to all food packaging.

Refined laboratory techniques have made package performance testing almost an exact science so that we can fairly well evaluate and rate a given packaging material as to its suitability for a specific application.

Some of the complexities involved in the evaluation of various packaging materials could be expressed as:

general characteristics
mechanical characteristics
chemical characteristics.

Perhaps a quick way to analyze some of the problems in candy packaging would be to enumerate all factors considered as potentially harmful on one side of the ledger and then to determine the properties of packaging materials that can be engineered into your package which will give the required amount of protection. This could be done in this manner:

Harmful Effects	Protective Properties
Light	Opacity
Lack of visibility	Transparency
Humidity	WVT resistance
Dehydration	WVT resistance
Flavor loss (e.g., essential oils of high volatility)	Gasproofness
Fat or oil penetration	Greaseproofness
Odor contamination	Gasproofness
Poor workability	Flexibility & freedom from static
Damage from crushing	Rigidity of package
Lack of toughness	Tensile & flexural strength.

These are just a few examples of how such a chart could be prepared.

Most successful packages have several fundamentals in package design in common:

Product protection
Structural strength
Acceptable unit size
Attractiveness.

Often they emphasize the value of a trademark—frequently they have a "family resemblance" to other packages produced by the same manufacturer. Sometimes they employ easy opening devices or reclosing features. They always meet legal requirements.

In regard to Art Work on your package, I would suggest that you leave the package designer some freedom of expression, since he has a highly special-

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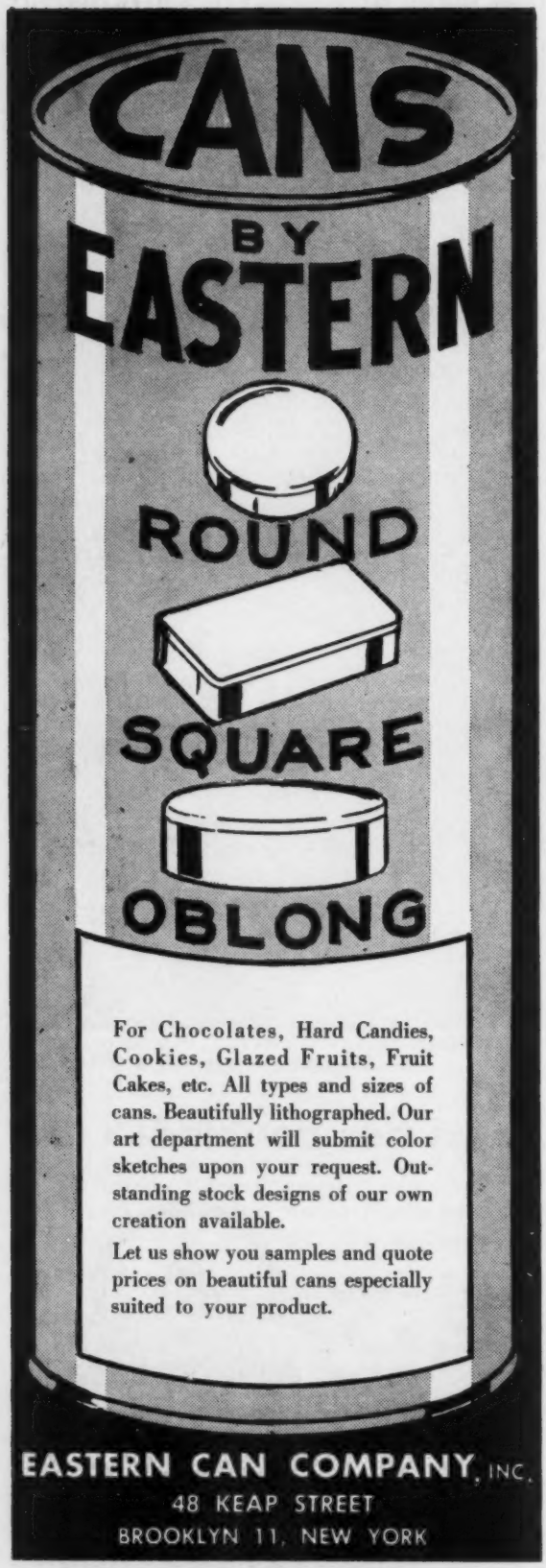
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ized knowledge. With proper art work a well designed package can be made to attract attention and win sales. You should try to arouse consumer interest and create the desire to buy. Thirty percent of the ladies are reported to have defective eyesight, but hesitate to wear glasses in public.

An action compelling package becomes a necessity for the many candy products which are being sold self-service today. The importance of a visible protective package for self-selection cannot be denied. While it is realized that many confectionery products have only a limited shelf life, the manufacturer tries to make this as long as possible by his formulation, choice of ingredients, method of processing. Proper storage and adequate packaging become equally important to him in maintaining them in perfect condition for reasonable periods. Factors tending to speed deterioration are many and will depend to some extent on the type of confection concerned. Perhaps the most important are temperature, dampness and light.

Many properties of the confection may be affected:

General appearance, e.g., fat bloom in chocolate or fat separation in toffees, sugar bloom, cracking.

Color, e.g., fading on exposure to strong light (pastel shades).

Texture, e.g., "graining or crystallization" or drying out in jellies.

Flavor loss or worse, development of off-flavor, such as light-induced chemical changes resulting in oxidation, particularly in products containing fats.

Since most of these undesirable changes are chemical in nature, control of temperature in storerooms becomes very important. In fact, refrigeration is most effective in retaining the eating qualities of chocolate covered candies and of protecting them from fat bloom. Moisture vaporproof sealed packages are essential in preventing gain or loss of moisture and in precluding moisture condensation upon removal from refrigeration, to preserve the finish of these candies.

Perhaps the most important single factor to control is humidity. Practically all confections contain moisture and this moisture content is of major importance for their texture. Some types will dry out or will lose moisture when exposed to the atmosphere; other types exposed to the same conditions will absorb moisture from the atmosphere and become sticky. It can be shown by theoretical calculations or by actual experimentation that all moisture containing candies have an Equilibrium Humidity at which they will neither lose nor gain moisture. Since these equilibria vary wth different confections from below 30 percent relative humidity to approximately 85 percent, it can readily be seen that they will require different packaging treatment.

In any event, good packaging should go hand in hand with proper storage conditions. The Georgia Experiment Station under Dr. J. G. Woodroof's guidance has done some excellent research work in that particular field. In one of his recent investigations, holding chocolate candies in storage, he demonstrated that moisture-proof packaging protected these refrigerated products from moisture damage.

It seems to me that there is a large potential market

in the southern states, where now very little candy is being consumed during summer because of climatic conditions. Perhaps with more adequate warehousing conditions, combined with better protective packaging, we could conquer this market. One converter suggested to me recently the packaging of marshmallows in either saran or polyethylene-coated cellophane, which in his opinion would give superior product protection under such adverse storage conditions.

In my review of available flexible packaging materials, I plan to cover the principal ones, omitting merely decorative papers, fancy papers, and such things as cellulose wadding or padding.

Among flexible packaging materials used by your industry we find:

Aluminum Foil

Foil is being used as a direct wrap of chewing gum, candy bars, chocolates, and many other candy items. This material is completely greaseproof, odorless, tasteless, entirely nontoxic, and has excellent moisture vapor resistance. Often we find it used in very thin gauges (e.g., .00035″).

Dimensionally foil is stable; also it is lightproof and offers in the heavier gauges complete gas resistance. Aluminum foil is claimed to reflect radiant heat. Foil as a result of its "dead fold" characteristics can be folded, molded, formed, and crimped easily—besides, it ages well. The limitation of foil's low tear strength is usually overcome by combining it with other materials. Uncoated aluminum foil will not heat seal. Foil provides many protective qualities and has considerable package appeal. It can be printed by all commercial processes. The use of foil overwraps for candy cartons is an increasing practice, since it combines an attractive printing surface with excellent moisture protection. Several peanut brittle manufacturers have adopted a foil-wax-tissue lamination as an overwrap.

Polyethylene

Doubtless the fastest growing film is polyethylene, a clear translucent or semi-transparent, flexible, tough thermoplastic that is free of odors, tasteless, nontoxic and chemically inert. Polyethylene contains no plasticizer, therefore no plasticizer migration can occur. This film will not dry out or embrittle and will remain tough and flexible during prolonged storage. Besides, it possesses excellent low temperature durability, is waterproof and has no tendency to stick to itself. Due to its low density it has a very high area factor which is about 20,000 sq. in. per pound for 1½ mil gauge. Polyethylene has good strength, tear resistance and puncture resistance—all important to the structural strength of a package. These properties are retained to a high degree over a wide temperature range. Polyethylene has an average WVT rate of 1.4 grams/100 sq. in/24 hours for film of 1 mil gauge (General Foods method 100 deg. F). Generally, in its most popular 1½ mil gauge polyethylene has water vapor transmission rates quite similar to moistureproof cellophane. It is interesting to note that an inverse proportionality exists between the WVT rate and the

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film gauge. Typical values of water vapor transmission for this film are:

1.4	grams	for	1	mil	gauge
.7	"	"	2	"	"
.38	"	"	4	"	"

Polyethylene is being used successfully on automatic bag machines and on filling equipment. It is now possible to obtain polyethylene commercially for either flexographic, letter press, or rotogravure printing. While polyethylene has not found much use thus far as an overwrapping film, because of mechanical problems, it is being used widely as a carton and drum lining material. As such, it may be used as a liner for bulk storage or for packaged storage of seasonal candies. Principally it is currently used in form of bags fabricated from rolls or tubing. The strength of this film is well known to most of us, a reason for which poly bags have found particular acceptance in packaging for super markets where consumer packages receive considerable handling. The application of polyethylene to candy packaging has produced some fine packages of which probably hard candies, marshmallows, gum drops, and circus peanut-type confections are a few of the better known examples.

This film has a relatively high gas transmission rate and therefore it is quite permeable to organic vapors, essential oils and related materials. A similar inverse proportionality of gas permeability to film gauge exists as the one discussed earlier relating to water vapor transmission. This thermoplastic will soften at about 110° C, and while critical in range can be heat sealed by a number of methods, ranging from the common heated bar sealer through hot wire, impulse, rotating band, heated roller, to flame sealing and electronic techniques.

In view of the fact that many factors will determine package performance, it is always advisable to test any proposed package prior to commercial adoption. General experience indicates that 1.5 to 2 mil is adequate for 1 or 2 lb. bags for gum drops, spice drops, orange slices, green leaves where shelf life is short and mechanical requirements are not severe. Film of 2 mil gauge has been found satisfactory on circus peanut type candies and 12 oz. to 1 lb. units of marshmallows. Frequently air is included in the bag before sealing, to serve as a cushion to prevent mashing or distortion of the product. Close moisture control in the manufacture of marshmallows is considered important and a 15.5 percent level has been found best.

Pliofilm (rubber hydrochloride)

Pliofilm is one of the early thermoplastic films that can be heat sealed to provide a weld-type bond. It is available in a variety of formulations; however, it is not being widely used in the candy industry. Pliofilm has a favorable yield factor, good folding endurance and can be used for stretch wrapping. Also, it possesses a low rate of water vapor permeability.

Cellulose Acetate

Cellulose acetate is comparatively little used as either a direct candy wrap or a carton overwrap. Be-

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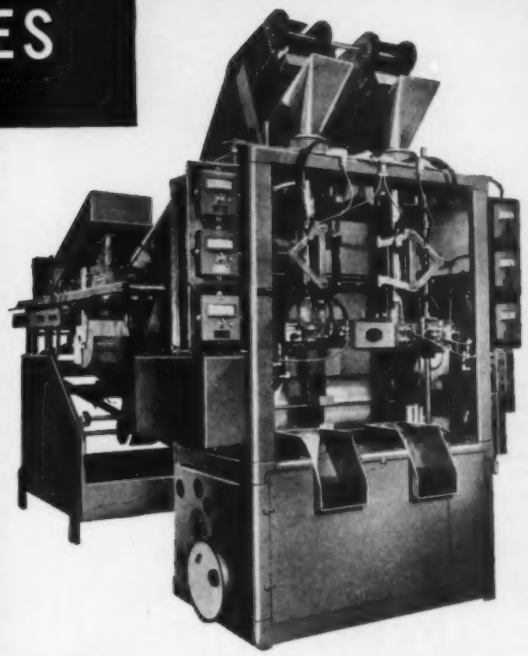

Model C Transwrap shown is for low head-room installations. It features floor-level feeder and automatic transfer unit.

Now available: 10 major new design features in the Model C Transwrap. You benefit from nearly a year's redesigning—the kind of engineering updating you expect from Package. Check these new features and see how much *more* Transwrap gives you.

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cause of its excellent dimensional stability it is idealy suited for box windows. Window boxes have made steady gains in the confectionery industry. In the heavier gauges this film has found use for the fabrication of rigid transparent containers which are used for counter display of bulk candy as well as for packaging of the higher priced specialties. While cellulose acetate can be used in vacuum forming, it is not a moistureproof film. Its permeability to gases is high. Also, it is somewhat critical to seal by heat alone. It is available in cast and extruded film. In heavier gauges it is usually known as sheeting.

Saran (polyvinylidene chloride)

Saran is perhaps the newest thermoplastic film to enter your industry. There are now a number of converters who know how to fabricate fine bags from this material. For the most part, basic saran of the 517 type is being used for candy bags. Several machine manufacturers are now utilizing electronic sealing equipment for this film. Saran has long been known for having the lowest rate of water vapor transmission of any transparent film used in packaging as well as for its strength, dimensional stability, resistance to chemical action, low gas permeability and good aging characteristics. It has been somewhat restricted in application because of its relatively high cost, special heat sealing requirements, and inability to handle with ease on high speed packaging equipment. Currently some of the following candy items, one pound or less, are packaged in saran bags: Jellies; individually wrapped candies; Spanish and blanched nuts in 100 gauge saran single wound; hard candy (no sharp points or edges) in 150 gauge saran single wound; hard candy (with sharp points or edges) in 200 gauge saran single wound. I have some examples here showing 2 types of printing on this film, one being the conventional surface type, the other representing "Unilox", a patented type, whereby the printing is locked between 2 layers of film. You will note the clarity and brillance of the film.

Saran-Coated Cellophane

Saran-coated cellophane combines some of the best properties of saran film with the most desirable qualities of cellophane, thereby overcoming some of the limitations of each material. Two suppliers have this film type on the market and a third supplier is producing it experimentally. In this case saran is used as a thin coating. This film has perfect clarity and prints well by any method. Its machine handling properties are excellent and there are fewer break throughs at the corners of the package, which often are a source of potential trouble. Its WVT rate is at least as low as that of good lacquer coated cellophane and one great advantage of this film is its resistance to puckering and wrinkling. Also its grease resistance is excellent. Often this film can be used in the #450 weight in place of a duplex bag.

Saran-coated cellophane has been recommended for marshmallows and other types of candy where a single wall construction of lacquer coated cellophane provides adequate durability, but insufficient protection.

Prolonged exposure to extreme conditions or to unusual product ingredients will not tend to a coating breakdown, neither is this coating susceptible to abrasion due to hard, scratchy products. In many cases saran-coated cellophane is being used for its appearance factors. Sugary products are reported to benefit from saran coating's immunity to attack by sugars. This will prevent degradation of moisture protection during shelf life. Smoothness and clarity will add to the quality impression of the product packaged in this film.

Glassine Papers

This basic wrapping material meets many packaging requirements and is available in a wide range of finishes, weights—differing in properties, color, clarity, opacity and gloss. In the candy industry glassine is often used as a direct wrap of bar goods, sometimes as a liner. This material can be made greaseproof, water vapor-proof, heat sealable. Moreover, it is available in types for high speed machine operation. Glassine can be coated or laminated by a wide variety of methods or formulations. Glassine-foil laminations are used on chewing gum. Colored glassine has found use in the manufacture of bon bon cups. Wax laminated types of glassine have good flexibility and can be molded. Glassine has been laminated to many types of film and to foil.

Waxed Papers

Several grades of sulphite papers and glassine are the most widely used base stocks of waxed papers. Waxed papers provide good product protection at relatively low cost. To my knowledge the candy industry uses mostly wet-waxed paper of the heat sealing type. The base material used in most coating formulations is paraffin wax. Higher seal strength, greater moistureproofness and improved low temperature flexibility can be obtained through additives such as polyethylene and microcrystalline waxes, which will give hard finish, high gloss and scuff resistnace to the coating. Waxed papers are odorless, tasteless and nontoxic. They can be printed by different methods and will lend themselves to operation on automatic packaging machines.

Laminated Structures

These structures offer in my opinion tremendous possibilities for the future, since several most desirable protective properties can be incorporated in a lamination which are not usually found in a single film.

In this category we find:

The cellophane to cellophane lamination, offering outstanding protection and strength *plus* rigidity for better display. Some excellent examples illustrating this type are these butter mint packages. Wrinkling is practically absent in these structures which have soft feel. This type of lamination allows sandwiching of the printing between the film layers, thereby protecting the print. No contamination by printing inks is possible. Depending on the laminants used, the WVT rate can be substantially lowered and the bursting strength is essentially increased. Cellophane-saran laminations have now become available for the nitrogen packaging of nut meats.

While not much work has been done in the candy industry with flexible packaging materials on inert gas or vacuum packaging, these two methods are being introduced in other branches of the food industry. Thus far certain film laminations have proven themselves in this field, while the development of suitable equipment has been rather slow. Cellophane-polyethylene laminations are quite similar to the cellophane-cellophane lamination; however, still greater flexibility is obtained in this combination. Reverse printed cellophane offers an excellent printed surface which is scuffproof and the poly member of the lamination offers permanent flexural strength. Foil-wax tissue candy bar wrappers make very effective packaging. Reverse printed cellulose acetate laminated to paper is well suited for candy boxes where outstanding beauty is the only requirement.

These are a few of the many possible combinations of laminated materials.

Mr. Spannagel presented a paper before the Chicago Section of the American Association of Candy Technologists in January, 1954, *titled "Cellophane Packaging in the Candy Industry". Copies of that paper are available from Sylvania Division,* 1647 *Pennsylvania Blvd., Philadelphia* 2, *Pa. The paper was also published in full in the February,* 1954 *issue of The Manufacturing Confectioner.*

The business of government is *everyone's* business

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During the last few years of continued high "emergency" taxes, more and more Americans have been asking, "Does Uncle Sam really need all this money? Is he spending it wisely?"

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But no one likes to invest even a dollar of his hard-earned money in waste and inefficiency. Sadly enough, a painful portion of your tax dollars is going right smack down the drain!

To cite a few examples . . . the Hoover Commission and other authoritative bodies have unearthed the following facts:

Because of different Government filing and letter writing practices, the cost of creating and filing the same typical 175-word letter may range from 15 cents to $2.50! (Multiply that gorss inconsistency by the billion letters written by Government agencies each year and you can visualize the savings which could be brought about by standardized practices.)

Employee turnover in the Federal Government ran the taxpayers $278,500,000 in replacement costs during 1954. By reducing the annual turnover just from the present 25 per cent to 20 per cent, some $50,000,000 a year would be saved.

The Commission on Organization of the Executive Branch of the Government . . . headed by former President Herbert Hoover and more widely known as the Hoover Commission . . . after a year and a half of study is now presenting to Congress its recommendations on how to achieve greater efficiency and economy in Federal Government. Several of the total of some 20 installments of the Hoover Report already have been presented. The others are to follow throughout the spring and early summer.

Reports thus far released point the way to substantial savings . . . not only ultimate tax savings, but also direct savings to business. A single example of particular interest to employers is a recommendation in the Paperwork Management Part I Report calling for authorization of changes in Tax Forms 941 and 941A (Employers Quarterly Federal Tax Return) as proposed by the Internal Revenue Service and Social Security Administration. The changes involve dropping the detailed information on each employee which now is required on the forms.

It has been estimated that this single change could mean a direct saving to employers of from $1 to $13 annually per employee. Two large companies alone have indicated that they will save about $50,000, and it is estimated that industry as a whole will save $22 million per year if favorable action is brought about.

This is but a single recommendation. It is believed that the total recommendations in the Paperwork Report could save the taxpayers a quarter-billion dollars a year. Others of the 20 reports undoubtedly will reveal equally as impressive possible savings.

In addition to paving the way to actual savings and more business-like procedures, Commission recommendations deal with the very philosophy of Government: "How big should Government be? What services should it provide to the public? What functions should it turn back to private enterprise?"

These are complex and sometimes abstract issues which must be converted into digestible form for public consumption. The job of "processing" and disseminating information is handled by the Citizens Committee for the Hoover Report, a bipartisan group formed to muster public support for Commission recommendations.

A broad, positive public campaign is now in the making. As the initial phase of the campaign, the Citizens Committee is mustering its own sizable membership and host of friends—individuals and organizations who supported the successful first Hoover Report (1949-'52)—to launch an intensive educational effort aimed at outdoing that conducted in behalf of the previous Report. Of that effort, Mr. Hoover said: "You have given the nation about the widest-spread education in civil government that it has had since the Constitution was under debate."

Here again a great debate is brewing. The powerful special interest pressure groups and bureaucrats already are voicing opposition to certain recommendations. They are violently opposed to any tampering with the status quo which would cut off their private pipelines into the public treasury, and which would conflict with their own selfish interests. But the campaign moves ahead with increased vigor because of this challenge.

Once the educational or "softening up" phase has been completed, the call will go out for action . . . action by hundreds of thousands of individual citizens, all expressing support of Hoover Commission recommendations designed to give them "better government at a better price."

While the Hoover Report is not heralded as a sure cure for the "income tax blues," it is guaranteed to lighten the attack and speed the convalescence.

Confectioner's News Briefs

Eugene Johnston Fretz, 37, formerly vice-president, has been elected president of the **Robert A. Johnston Company.** His promotion follows the untimely death of Edward C. Johnston earlier this year.

Fretz is the fifth president since the company was founded 107 years ago by his great-grandfather. Fretz joined the company in 1940, served in the Air Force, and returned as a district sales manager in the candy division. He held various other positions in the candy division until elected secretary in 1948, and vice-president in 1952.

Four vice-presidents were elected; **Fred W. Drenk, Jr.,** vice-president and general sales manager; **Robert L. Feind,** vice-president and controller; **Roland J. Koehler,** vice-president in charge of purchasing; and **Harold W. Ward,** manager of sales and manufacturing at the company's plant at Hillside, N.J. **Erwin E. Kienappel** has been promoted to the position of secretary and treasurer.

Mrs. Otto Schnering, widow of the founder of the **Curtiss Candy Company** was elected a director of that firm. She replaces **Howard J. Anderson** who retired recently. The

Are you needlessly using two different machines when one Elec-tri-pak will do the job? Or, are you holding off automatic packaging because you think more than one filling machine is needed? You don't need to!

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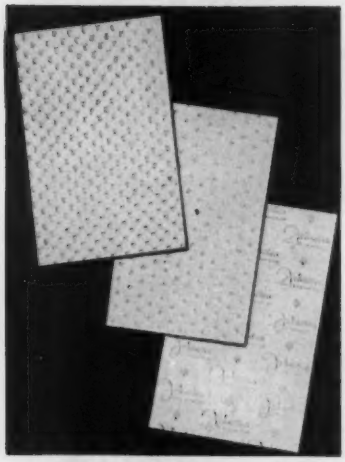
FIBREDOWN®
CELLULOSE
PADDING



- ATTRACTIVE
- SNOW-WHITE
- RESILIENT
- ABSORBENT
- NON-STAINING

Fibredown® is available with or without a backing — embossed in one of our numerous stock designs, or with your trade mark.

As manufacturing converters we can supply the EXACT padding your package requires:

- Sheets to 40" one dimension
- Rolls to 60" in width
- 1 to 50 ply thickness
- White M.G. or glassine backing
- Stock or private design embossing

Our prices are right! Send today for new sample book and quotations on your sizes, plies and quantities.

The GENERAL CELLULOSE CO., INC.
GARWOOD 3, N. J.

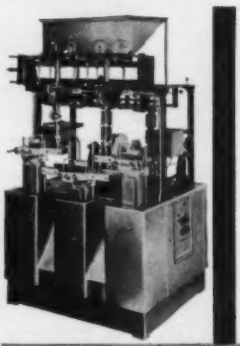
company also announced the election of a new vice-president, **George B. Cox,** who has been personnel director of the firm since 1942.

Robert D. Handley has been appointed director of publicity for the **Glassine and Greaseproof Manufacturers Association.**

Bakelight Company has announced a new polyethylene resin that makes possible easier opening bags. Designed for thin film extrusion, this new resin achieves good slip without loss of clarity and impact strength. The problem of the film sticking to itself has been overcome by internal modification of the resin.

Vacuum Candy Machinery Company and **Racine Confectioner's Machinery Company** have been appointed exclusive agents for the following European manufacturers of confectionery and chocolate machinery; **Hansella,** manufacturers of continuous vacuum cookers, continuous automatic disolvers, and plastic and tablet plants, including horizontal or vertical batch rollers, sizers and cooling conveyors. **Mikrovaerk,** makers of Jensen complete chocolate moulding plants, for all sizes of chocolate bars (including ten pound cakes) and complete systems for the production of continental moulded chocolates. **Bauermeister,** manufacturers of complete chocolate refining plants including cocoa grinder, refiners, conches (rotary and longitudinal), melangeurs and tempering kettles. **CMD (Bruno),** manufacturers of coin foiling and wrapping machines for candy and gum. **Sapal,** manufacturers of candy and chocolate wrapping machines. The Vacuum-Racine will represent all of these companies in both the United States and Canada.

It has been reported that the **Peter Paul** coconut desiccating factory in the Philippine Islands will start manufacturing candy from coconut in the near future. Local materials are to go into these products that are to be similar to those made in the U.S. plants of Peter Paul. **Virgil Murray,** manager of the coconut factory, will also manage the candy operations.



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Counsel
MACHINE COMPANY INC
8 HATHAWAY ST
WALLINGTON N. J.

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CANDY PACKAGING

Published bi-monthly by

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OAK PARK, ILLINOIS

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THE CANDY BUYER'S DIRECTORY

THE PURCHASING EXECUTIVES BLUE BOOK

Publisher

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Advertising Offices:

OAK PARK, ILLINOIS
Allen R. Allured
418 No. Austin Blvd.—VIllage 8-6310

New York 36, N. Y.
James W. Allured
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JUNE Vol. 15, No. 3 **1955**

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6842 Westfield Ave., Camden, N. J.

CALENDAR

June 5-8—Associated Retail Confectioners of the United States, Drake Hotel, Chicago, Ill.

June 5-10—National Confectioners' Association, Conrad Hilton, Chicago, Ill.

June 6—Confectionery Salesmen's Club of Baltimore monthly meeting at Gannons, 3150 Fred'k Rd. at 12:30 P.M.

June 10—Los Angeles Confectionery Sales Club, Inc. monthly meeting at Rodger Young Auditorium, 936 W. Washington Blvd., Los Angeles.

June 11—Carolina Confectionery Salesmen's Club monthly meeting at Kuester's, Charlotte, N. C.

June 14-15-16—National Confectionery Salesmen's Association of America 75th annual convention at Wentworth-By-The-Sea, Portsmouth, N. H.

June 17—Semi-Monthly meeting of the Denver Association Manufacturers' Representatives, Daniels & Fisher Store Dining Room

June 17-18-19—Boston Confectionery Salesmen's Club 26th anniversary at Wentworth-By-TheSea, Portsmouth, N. H.

June 21—Candy Executive Club, St. George Hotel, Brooklyn, N.Y.

July 13—Southern Salesmen's Candy Club, Hotel Roanoke, Roanoke, Va.

July 14-15—Southern Wholesale Confectioners Association, Hotel Roanoke, Roanoke, Va.

July 16-19—Metropolitan Candy Brokers' Association annual exposition, Hotel Commodore, New York, N. Y.

July 21—Empire State Candy Club Stag Clambake, Hinderwadels Grove, N. Syracuse, N.Y.

July 31-August 4—National Candy Wholesalers Association, Sherman Hotel, Chicago, Ill.

August 28-31—65th Semi-Annual Boston Candy Show at the Hotel Statler, Boston, Mass.

August 28-29-30—National Fancy Foods & Confection Show, Astor Hotel, New York.

September 11-14—Philadelphia Candy Show, Ben Franklin Hotel, Philadelphia, Pa.

September 15-18—Annual Meeting Packaging Machinery Manufacturers Institute, The Homestead, Hot Springs, Va.

September 22-23-24—Michigan Tobacco & Candy Distributors Association convention at the Statler Hotel, Detroit, Mich.

September 27—Candy Executives Club Annual Shore Dinner.

September 29-30 and October 1—Indiana Tobacco & Candy Distributors Association Convention-Meeting at the Claypool Hotel, Indianapolis, Ind.

October 18—Candy Executives Club 25th Anniversary Meeting.

December 9-10—Western Confectioner Salesmen's Assn. Annual convention, Congress Hotel, Chicago, Ill.

March 1-2, 1956—Western Candy Conference, Sheraton-Palace Hotel, San Francisco.

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PROGRAM PREVIEW

72nd

ANNUAL CONVENTION

NATIONAL CONFECTIONERS' ASSOCIATION

JUNE 5-9, 1955

THE CONRAD HILTON, CHICAGO, ILLINOIS

Monday, June 6, 1955

NCA-AACT Joint Production Session

APPLIED CANDY RESEARCH
DR. L. F. MARTIN, Head, Sugarcane Products Section, Southern Regional Research Laboratory, United States Department of Agriculture, New Orleans, Louisiana

DAIRY PRODUCTS FOR USE IN CANDIES
E. O. WHITTIER, Assistant Head, Dairy Products Section, United States Department of Agriculture, Agricultural Research Service, Eastern Utilization Research Branch, Washington, D. C.

NEW DEVELOPMENTS IN FATS, OILS AND ANTI-OXIDANTS FOR CANDY
Animal Fats
B. F. WOERFEL, Assistant Production Manager, Armour and Company, Refinery Division, Union Stock Yards, Chicago, Illinois
Vegetable Fats
DR. CHESTER M. GOODING, The Best Foods, Inc., Bayonne, New Jersey

REPORT ON NCA SUBCOMMITTEE ON CONFECTIONERY COATINGS
NORMAN W. KEMPF, Manager of Chocolate Development, Walter Baker Chocolate and Cocoa, Division General Foods Corporation, Dorchester, Massachusetts—Chairman, Subcommittee, Research and Development Committee on Confectionery Coatings

AUTOMATION
JOHN V. ZIEMBA, Midwest Editor, Food Engineering, Chicago, Illinois

PANEL SESSION—AUTOMATION
In Cooking
PRESTON FARLEY, President, Farley Manufacturing Company, Skokie, Illinois
For Aerated Confections
JUSTIN J. ALIKONIS, Director of Research, Paul F. Beich Company, Bloomington, Illinois
In Cooling
E. H. MORGAN, Reflectotherm, Inc., Cincinnati, Ohio

MERCHANDISING FROZEN CANDY
FRED J. ARNOLD, Vice President, Fannie May Candy Shops, Chicago, Illinois

Tuesday, June 7

"LET'S SHOW SOME GUMPTION AND INCREASE CANDY CONSUMPTION"

WHAT PEOPLE THINK ABOUT CANDY—A REPORT OF SPECIAL MARKET RESEARCH SURVEY ON CANDY EATING HABITS CONDUCTED FOR NCA
ROBERT F. ELRICK, President, Elrick-Lavidge & Company, Chicago, Illinois

THE PLACE OF CANDY IN THE EVERYDAY DIET
The Doctor
DR. FRANKLIN C. BING, Consultant in the Food and Drug Field, Chicago, Ill.
The Dentist
DR. GERALD J. COX, Professor of Dental Research, University of Pittsburgh School of Dentistry, Pittsburgh, Pennsylvania
The Military
MAJOR GENERAL H. L. PECKHAM, Army and Air Force Exchange Service, New York, New York
Civil Defense
GENERAL ROBERT M. WOODWARD, Director, State of Illinois Civil Defense, Chicago, Illinois

THE FOUR PILLARS OF PROFIT
LOUIS CHESKIN, Director, Color Research Institute of America, Chicago, Illinois

OPENING LUNCHEON
Luncheon Speaker
THE HONORABLE THOMAS E. MARTIN, United States Senator, Iowa

Wednesday, June 8

SALES AFFECTED BY EXTERNAL FORCES—INGREDIENT SUPPLIES—TODAY AND TOMORROW
The Cocoa Bean Hazard
CLIVE C. DAY, President, Association of Cocoa and Chocolate Manufacturers of the United States, White Plains, New York
The Peanut Fiasco
CHARLES F. SCULLY, President, Williamson Candy Company, Chicago, Illinois
Chairman, NCA Peanut Committee

The Sugar Dilemma
THEODORE STEMPFEL, E. J. Brach & Sons, Chicago, Illinois
Chairman, NCA Sugar Committee

The Legislative Impact
HARRY R. CHAPMAN, Chairman, NCA Washington Committee

THE INTERNATIONAL MEETINGS AT AMSTERDAM
JOHN M. WHITTAKER, Executive Vice President, New England Confectionery Company, Cambridge, Massachusetts
SAM SHANKMAN, Executive Vice President, Leaf Brands, Inc., Chicago, Illinois
CLIFFORD SPILLER, General Manager, Walter Baker Chocolate & Cocoa, Division General Foods Corporation, Dorchester, Massachusetts
ALBERT S. NEMIR, Consultant, Food Industries Division, Business & Defense Service Administration, U.S. Department of Commerce, Washington, D. C.

DIRECTED GUMPTION INCREASES CONSUMPTION
Candy Sales and Distribution Trends (Report of Department of Commerce Survey)
JOHN S. VANDER HEIDE, Director, Food Industries Division, Business & Defense Service Administration, U. S. Department of Commerce, Washington, D. C.

DO FINANCIAL STATISTICS SHOW PROFITS FOR PROGRESS?
(A special report to members on results of Financial Operations Survey of Candy Industry)
HORACE G. BARDEN, Resident Partner, Ernst & Ernst, Chicago, Illinois

Wednesday Evening Technical Session

FILM: COCONUT PROCESSING—Courtesy of Franklin Baker Division of General Foods Corporation

YOUR CANDY CLINIC—ANSWERS TO YOUR PROBLEMS
Panel Members
JAMES A. KING, The Nulomoline Division of American Molasses Company
L. RUSSELL COOK, Ambrosia Chocolate Company
HOWARD G. AYLESWORTH, Burrell Belting Co.
GERALD S. DOOLIN, NCA Staff
WILLIAM HOOVER, Refrigeration Research Foundation
AMERIGO D'AGOSTINO, Supermatic Packaging Corporation
DR. J. M. NEWTON, Clinton Foods, Inc.
EDWARD W. MEEKER, American Sugar Refining Company
MARVIN W. COCHRAN, Durkee Famous Foods, Division of The Glidden Company
DR. J. G. WOODROOF, Georgia Agricultural Experiment Station

Thursday, June 9

YOUR EMPLOYEE RELATIONS

LABOR TRENDS
ROBERT LEWIN, Labor Editor, Chicago Daily News, Chicago, Illinois

LEGISLATIVE TRENDS AFFECTING EMPLOYEE RELATIONS
WILLIAM B. BARTON, General Counsel, Chamber of Commerce of the United States, Washington, D. C.

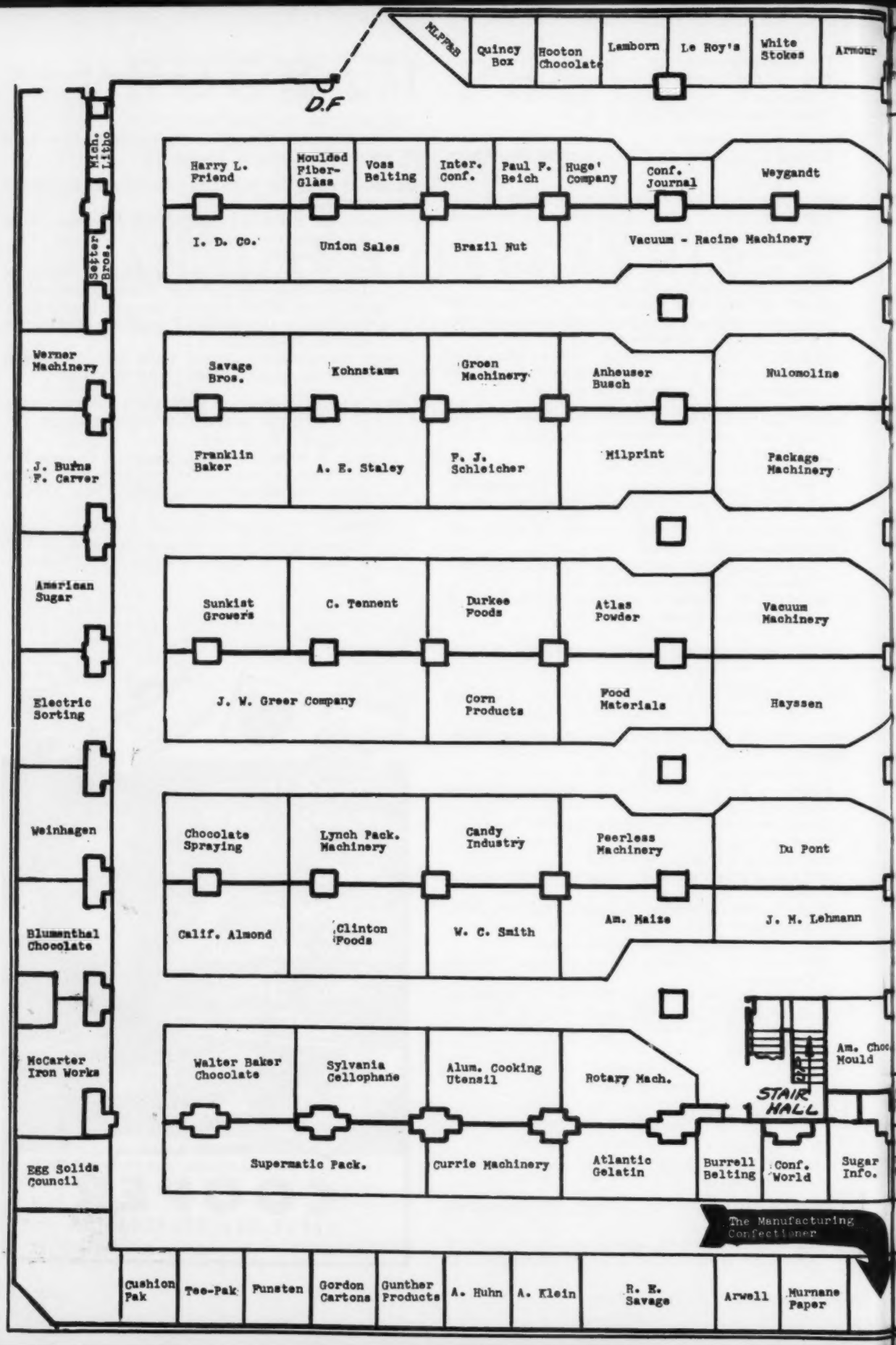
HEALTH AND WELFARE TRENDS
EDWARD MACK, JR., Mack and Parker, Chicago, Illinois

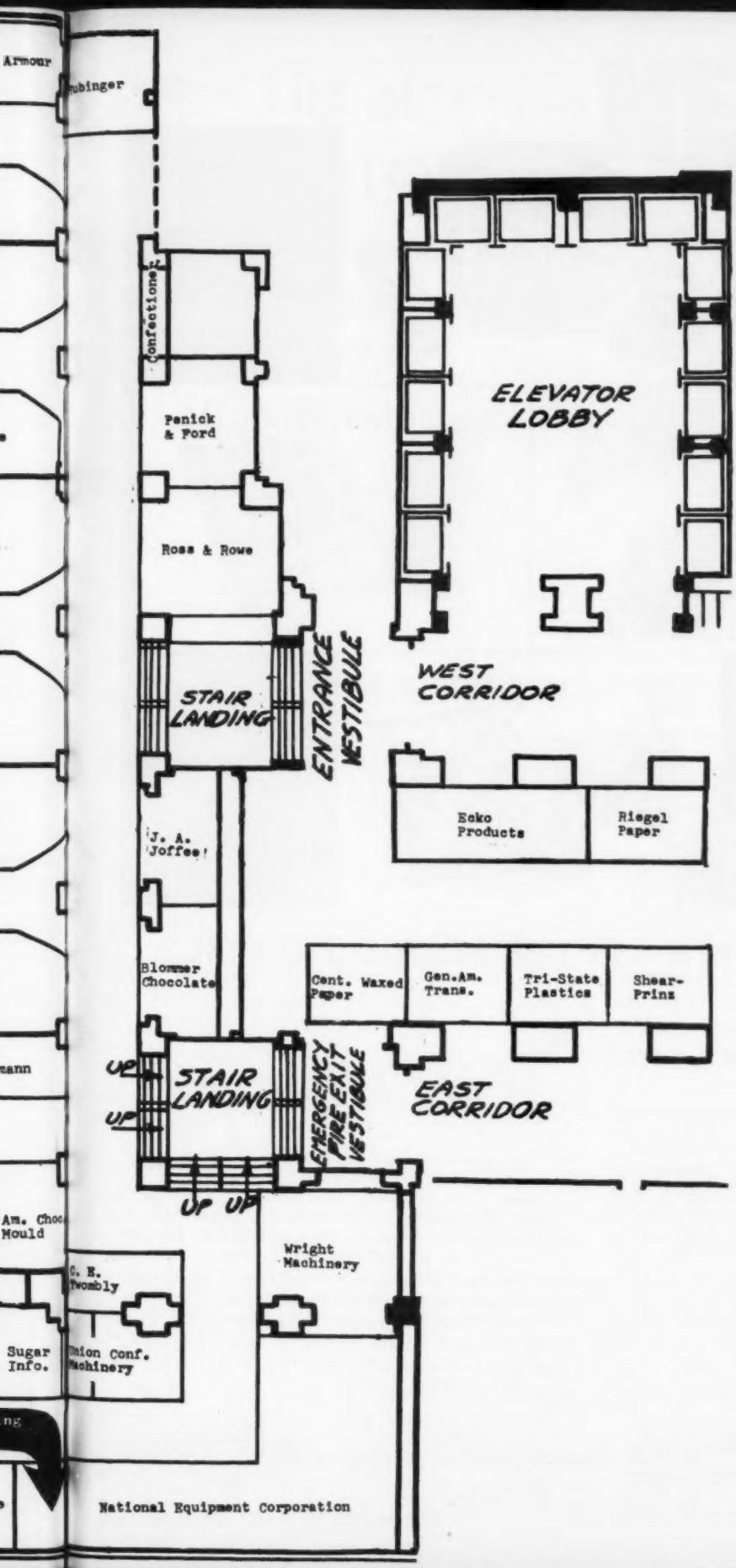
SHORTCUTS TO COST REDUCTION
ALEXANDER PROUDFOOT, President, Alexander Proudfoot Company, Chicago, Ill.

IMPORTANCE OF TRAFFIC CONTROL IN BUSINESS MANAGEMENT
Moderator: JOHN S. BURCHMORE, Burchmore, Good & Bobinette, Chicago, Illinois
Panel Participants:
ARTHUR S. GENET, Vice President in charge of Traffic, Chesapeake and Ohio Railroad, Cleveland, O.
ROBERT MCBRIDE, General Manager, Regular Common Carrier Conference of American Trucking Association, Washington, D. C.
RAY V. HARRON, General Traffic Manager, General Foods Corporation, White Plains, New York

THE TECHNOLOGICAL APPROACH TO INCREASE SALES THROUGH RESEARCH AND QUALITY DEVELOPMENT PROGRAMS
DR. L. F. MARTIN, Head, Sugarcane Products Section, Southern Regional Research Laboratory, United States Department of Agriculture, New Orleans, Louisiana
NORMAN W. KEMPF, Manager of Chocolate Development, Walter Baker Chocolate & Cocoa, Division of General Foods Corporation, Dorchester, Massachusetts

COOPER STYLED
FOLDING CANDY BOXES
first lesson in how to increase Candy Sales YEAR ROUND
WRITE FOR DISPLAY BROCHURE OF BOX STYLES AND PRICES
COOPER
PAPER BOX CORPORATION
DEPT. M
BUFFALO 4, NEW YORK


MLPP&B
Quincy Box
Hooton Chocolate
Lamborn
Le Roy's
White Stokes
Armour
D.F
Mich. Litho
Setter Bros.
Harry L. Friend
Moulded Fiber-Glass
Voss Belting
Inter. Conf.
Paul F. Beich
Huge' Company
Conf. Journal
Weygandt
I. D. Co.
Union Sales
Brazil Nut
Vacuum - Racine Machinery
Werner Machinery
Savage Bros.
Kohnstamm
Groen Machinery
Anheuser Busch
Nulomoline
J. Burns F. Carver
Franklin Baker
A. E. Staley
F. J. Schleicher
Milprint
Package Machinery
American Sugar
Sunkist Growers
C. Tennent
Durkee Foods
Atlas Powder
Vacuum Machinery
Electric Sorting
J. W. Greer Company
Corn Products
Food Materials
Hayssen
Weinhagen
Chocolate Spraying
Lynch Pack. Machinery
Candy Industry
Peerless Machinery
Du Pont
Blumenthal Chocolate
Calif. Almond
Clinton Foods
W. C. Smith
Am. Maize
J. M. Lehmann
McCarter Iron Works
Walter Baker Chocolate
Sylvania Cellophane
Alum. Cooking Utensil
Rotary Mach.
STAIR HALL
Am. Choc. Mould
Egg Solids Council
Supermatic Pack.
Currie Machinery
Atlantic Gelatin
Burrell Belting
Conf. World
Sugar Info.
The Manufacturing Confectioner
Cushion Pak
Tee-Pak
Punsten
Gordon Cartons
Gunther Products
A. Huhn
A. Klein
R. E. Savage
Arwell
Murnane Paper



29th
Annual National Confectioner's Association
Exposition
Conrad Hilton Hotel
Chicago, Illinois
June 6, 7, 8 & 9 1955

Exposition Hours

Monday, June 6
2 p. m. - 6 p. m.

Tuesday, June 7
1 p. m. -6 p. m.

Wednesday, June 8
11 a. m. - 5 p. m.

Thursday, June 9
12 noon - 8 p. m.

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Profit-conscious food packers choose the added protection of Saran film

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List of EXHIBITORS

with products to be displayed and names of representatives attending

NCA Exhibition

Conrad Hilton Hotel
Chicago, Illinois
June 6, 7, 8 & 9

ALUMINUM COOKING UTENSIL CO. New Kensington, Pa. Booth 508

AMERICAN CHOCOLATE MOULD CO., INC. 173 Lafayette Street, New York 13, New York. Booth 510. Complete line of latest moulds for solid chocolate bars, cakes, small fancy pieces for continental box goods, hollow moulds in the various figures for the different holidays; also ice cream and baking egg moulds. In attendance: Sam Friedwald, George Freidwald, Mary F. Prensky, Jerome Prensky, Herbert Friedwald.

AMERICAN MAIZE-PRODUCTS COMPANY. 250 Park Avenue, New York 17, New York. Booth 502. Corn Syrups and starches. In attendance: T. Sander, J. B. Melick, C. H. Sanford, R. L. Lloyd, F. J. Wobbekind, H. J. Hammer, J. B. Brouwer, E. V. Haynes, J. J. Binder, W. J. McKee, E. R. Sterbenc, J. C. Crumley, R. R. Pelo.

THE AMERICAN SUGAR REFINING COMPANY. 120 Wall Street, New York 5, New York. Booth 15. Sugar. In attendance: E. Tindall, C. B. Castle, E. W. Meeker, S. H. Fleming.

ANHEUSER-BUSCH, INC. 721 Pestalozzi St., St. Louis 18, Missouri. Booth 209. In attendance: Arthur E. Weber, Tate M. Robertson, Jr., Richard F. Amacher, Harry A. Best, Jr., Willie J. Simms, Frank Voyda, Robert T. Regan, Raymond L. Haffey, Anton H. Luetkemeyer.

ARMOUR & COMPANY, Union Stock Yards, Chicago 9, Ill. Booth 4. Products: Kokolene, Armola, Kremax—quality fats for the confectioner. In attendance: M. B. Medlock, Jr., J. A. Lloyd, G. W. Eddington, H. L. Versen, L. M. Warren, Jr.

ARWELL, INC. 1119 Glen Rock Ave., Waukegan, Illinois. Booth 28. Arwell insecticides for confectionery plants. Arwell spraying equipment. In attendance: J. P. Irvine, Emmet Champion, Lou Jansky, John Kielp, John Mock.

NEW! FROM ARMOUR

KOKOLENE

A SPECIAL FOOD FAT FOR USE BY CONFECTIONERS

RECOMMENDED FOR USE IN ALL CANDIES AND OTHER CONFECTIONERY PRODUCTS REQUIRING HIGH SHORTENING PROPERTIES. LONG SHELF LIFE AND ENTIRELY NEUTRAL FLAVORED FAT.

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A Special Food Fat for Caramels, Nougats, Fudge

- Completely neutral flavor . . . snow white
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- Increased stability . . . in excess of 100 hours on the A. O. M.
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- Truly digestible
- No formula change needed with Kokolene

Kokolene is a new type food fat made especially for the finest caramels, nougats, fudge, and melt-aways. Use Kokolene wherever a completely neutral, snow-white fat is required. You'll be amazed at the quality you will get and the real saving in cost. Kokolene is made under U. S. Government Inspection and contains a Government Approved anti-oxidant which will give your products longer shelf life.

Kokolene is available in 50-lb. and 110-lb. cans, 400-lb. drums, tank cars and trucks. Ask your Armour Salesman for a sample and full information.

Let Armour Technicians show you how Kokolene is solving many real production problems for candy makers . . . helping them increase sales and profits by making better candy. Write to Armour and Company.

Armour and Company
Refinery Sales Department · Chicago 9, Illinois

ATLANTIC GELATIN, Division General Food Corporation. Hill Street, Woburn, Massachusetts. Booth 41. Gelatin. In attendance: C. H. Watson, J. A. Dunn, Arthur F. Tole, Norman Vance, Jr., O. W. Johnson.

ATLAS POWDER COMPANY, Wilmington 99, Delaware. Booth 309. Sorbitol and Emulsifiers. In attendance: Howard W. Dellard, J. T. Zolper, William Mather, Joseph J. Byrnes, William W. Hays, Sherwood Cross, Charles Rowe, Norman D. Kennedy.

FRANKLIN BAKER DIVISION, General Foods Corporation. 15th & Bloomfield Sts., Hoboken, New Jersey. Booth 305. Coconut and coconut products. In attendance: Charles W. Rehor, Harry T. Easton, Harry P. Haldt, Graham T. Brown, George W. McCullum, David E. Miller, John I. MacDonald, Alan J. Post, Wesley L. Bonney, A. Frank Lilien, Milton E. Barker, Arthur E. Olson.

WALTER BAKER DIVISION, GENERAL FOODS CORP. Pierce Square, Dorchester 24, Massachusetts. Booth 506. La Belle Coatings (new products). In attendance: Clifford Spiller, Thomas G. Churchill, Raymond G. Schnyer, Andrew B. Markhard, John A. Buzzard, William A. Medlicott, Daniel E. Hegarty, Norman W. Kempf.

PAUL F. BEICH COMPANY, Bloomington, Illinois. Booth 104. Whizolator for aerated confections, Alikonis one-step chocolate process. In attendance: Paul M. Beich, William A. Beich, Justin J. Alikonis, Harold Hillman, Charles Olson, Al Schroeder.

THE BLOMMER CHOCOLATE COMPANY. 600 West Kinzie St., Chicago, Illinois Booth 512. Chocolate coating. Cocoa. Blommer Tempering Tube & chocolate mixers. In attendance: Joseph Thoman, Dewey Morrison, William Dierker, Dick Gans, Al Blommer, Henry Blommer.

BLUMENTHAL BROS. CHOCOLATE CO. Margaret & James Sts., Philadelphia 37, Pennsylvania. Booth 18. Chocolate coatings. In attendance: Samuel K. Blumenthal, Lawrence Blumenthal, Bernhard S. Blumenthal, Clyde Sternberber, C. R. Pariente, Hobart L. Thurber, Hobart L. Thurber, Jr., C. R. Page, Richard Thommen.

BRAZIL NUT ADVERTISING FUND. 100 Hudson St., New York 13, New York. Booth 203. Brazil Nuts. In attendance: T. R. Schoonmaker, Mrs. T. R. Schoonmaker.

JABEZ BURNS & SONS INC. 600 West 43rd St., New York, New York. Booth 14. Pictorial display of chocolate and nut processing equipment—chocolate molds. In attendance: J. L. Robinson, George L. Lingner, Barclay Spence, C. A. Anderson.

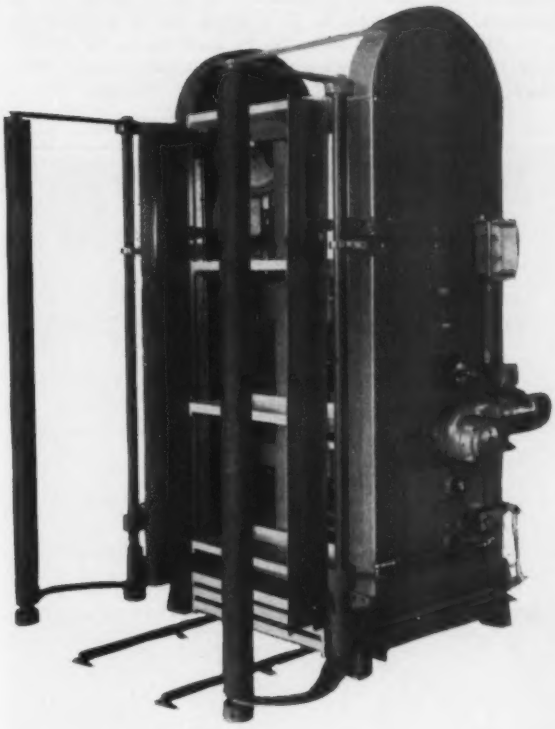
BURRELL BELTING COMPANY, 7501 N. St. Louis Ave., Skokie, Ill. Booth 40. Products: Belting. In attendance: E. F. Mayer, J. M. Moyer, Howard Aylesworth.

CALIFORNIA ALMOND GROWERS EXCHANGE. P. O. Box 1768, Sacramento 8, Calif. Booth 505. Shelled almonds and samples of almond candies. In attendance: Dale Morrison, Robert Clement, William Dignam, Thomas Doyle.

FRED S. CARVER, INC. One Chatham Rd., Summit, New Jersey. Booth 14. Cocoa presses. In attendance: Wm. S. Carver, Chas. D. Meylan.

The All New CURRIE *Automatic* STARCH TRAY FEEDER

Cut Production Costs!



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- *All new design*
- *Stack draw-in rolls operate over entire stack*
- *Low maintenance cost*

1. *All new design tray carrier*
2. *Dolly or lift truck conveying system*
3. *Rugged construction throughout*
4. *Standard chains, sprockets and gears*

CURRIE MACHINERY COMPANY

1150 Walsh Ave., Santa Clara, Calif.

CENTRAL WAXED PAPER CO., Chicago, Ill. Booth 1D

CHOCOLATE SPRAYING CO. 2035 W. Grand Ave., Chicago 12, Illinois. Booth 406. One Latini continuous Die Pop machine with wrapping attachment, revolving pan, and chocolate decorator. In attendance: Leo Latini, Ed. Latini, John Latini, John Sheffman, Gilbert Holmberg.

CLINTON FOODS INC., Clinton, Iowa. Booth 504. Products from corn. In attendance: R. C. Wagner, H. A. Bendixen, A. C. Junge, E. D. Cottral, M. H. Eddington, E. C. Alderson, R. C. Rau, W. F. Jackson, L. H. Smith, L. D Buhrer, R H. Jackson, J. M. Search, R. E. Mikkelsen, G. F. Heath, T. R. Miller, W. P. Hoaster.

HOOTON

CHOCOLATE

COATINGS • LIQUORS • COCOAS

• A dependable source of supply for taste, appearance, and uniformity. Top performance—both product and service will appeal to you.

HOOTON CHOCOLATE COMPANY

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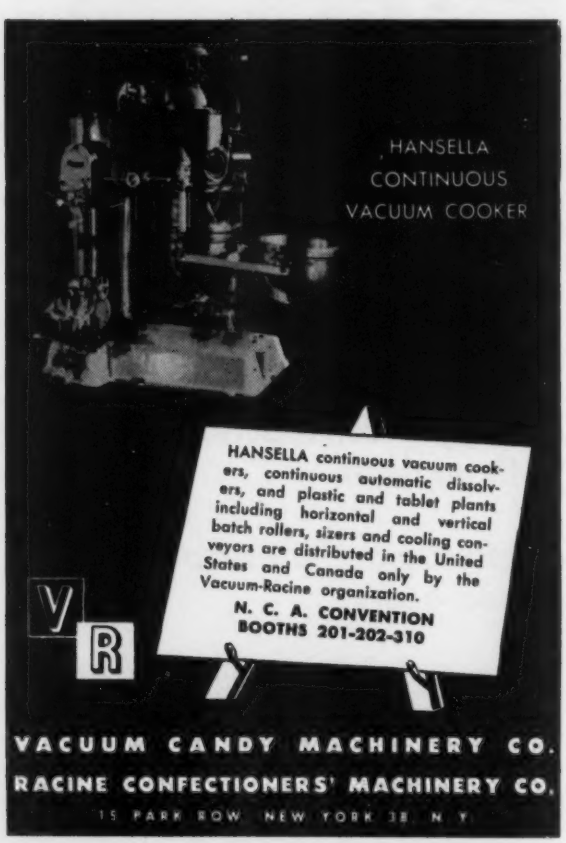
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CORN PRODUCTS SALES CO., 17 Battery Place, New York 4, N. Y. Booth 403.

CURRIE MACHINERY COMPANY. 1150 Walsh Avenue, Santa Clara, California. Booth 42 and 43. In attendance: D. M. Currie, H. W. Currie, D. W. Currie, T. Oakes.

CUSHION PACK, INC. 150 Fifth Ave., Hawthorne, New Jersey. Booth 20B. Cushioning pads and liners for candy boxes and packages. In attendance: Veronica S. Mazur, Courtney H. Reeves, Jr.

E. I. DU PONT DE NEMOURS & COMPANY. Wilton 98, Delaware. Booth 410. Merchandising ideas for holiday sales—Christmas, Halloween, Valentine's Day, Easter, etc. Featuring holiday bands, sleeves and overwraps. Packages that can be easily converted back to standard items after the holiday is over. Cellophane-wrapped packages. In attendance: B. C. Robbins, W. J. Yerkes, D. B. Roach, R. J. Crowley, K. M. Scheu.

DURKEE FAMOUS FOODS, Div. of the Glidden Co., 2670 Elston Ave., Chicago 47, Illinois. Booth 308. Confectioners fats and oils, dessicated coconut, spices and flavors. In attendance: G. N. Bruce, E. G. Kaupert, C. W. Lantz, H. S. Davis, P. Welker, R. Wolfe, M. Cochran, W. Hanks, J. Hammond, S. Eaton, R. Nickson, J. Carter, J. Toll.

EGG SOLIDS COUNCIL. 221 N. La Salle Street, Chicago 1, Illinois. Booth 20A. Fine candies made with egg white solids (egg albumen) will be displayed and distributed. In attendance: Edna Carson, C. R. Piowaty, D. J. Purcell, C. B. Hartman.

EKCO PRODUCTS, Chicago, Ill. Booth 1B, 1C

ELECTRIC SORTING MACHINE COMPANY. 410-44th Street, N. W. Grand Rapids 8, Michigan. Booth 16. New high capacity photoelectric sorting machine for peanuts and other nuts. Pneumatic Separator and Vibraotyr Feeder. In attendance: S. B. Parker, C. L. Palmquist, Glenn Ledger.

FOOD MATERIALS CORPORATION. 2521 West 48th Street, Chicago 32, Illinois. Booth 402. Flavors made to fit your products. In attendance: E. E. Feight, E. N. Heinz, E. W. Jeffress, R. W. Koch, H. A. Ackermann, G. L. Buckley, L. G. Drusendahl, R. G. Richards.

HARRY L. FRIEND, Boston, Mass. Booth 108

R. E. FUNSTEN CO. 1515 Delmar Blvd., St. Louis 3, Missouri. Booth 22. Shelled pecans and eastern black walnuts. In attendance: H. L. King, P. A. Noble, L. T. Schwieder.

GENERAL AMERICAN PFAUDLER CORPORATION. 135 S. La Salle Street, Chicago 90, Illinois. Booth 1 E. Model liquid chocolate car. In attendance: J. W. Staples, Helen Leonard.

GORDON CARTONS, INC. 1629 Warner Street, Baltimore 30, Maryland. Booth 23. Candy boxes of various styles. Holiday packages, particularly display window easter egg boxes and candy cane boxes. "Neutrotex" coating. In attendance: S. Gordon, Charles B. Debuskey, Louis K. Frank, A. R. Miller.

J. W. GREER COMPANY, Wilmington, Mass. Booth 404, 405. Products: Multi-tier model and blow-up photographs. In attendance: Don Greer, Fred Greer, Rodney Grace, C. G. Cockinos, George Dolber.

GROEN MFG. CO. 4535 Armitage Ave., Chicago 39, Illinois. Booth 208. Stainless steel steam jacketed kettles –kettles with agitator–revolving pan. Vacuum kettle. In attendance: Fred Groen, Fred Groen, Jr., Jim Flegg, Bob Groen, Joe Corcoran, E. O. Barth, R. Stanfield.

GUNTHER PRODUCTS, INC. 600 East Main St., Galesburg, Illinois. Booth 24. G-400V whipping protein & G-400H whipping protein. In attendance: J. K. Gunther, Robert C. Gunther, J. Ray Turner, Sam E. Kostelny, Bernard E. Blake.

HAYSSEN MANUFACTURING COMPANY. Sheboygan, Wisconsin. Booth 401. High speed packaging of pieces of candy in a flexible package to exact count. In attendance: William A. Hayssen, J. C. Johnston, Henry Knoechel, Fred Koehn, Ed. Griffin, O. A. Tomei, Russell J. Clayton.

HOOTON CHOCOLATE COMPANY. 355 North 5th St., Newark 7, New Jersey. Booth 8. Chocolate coatings, liquors and cocoa powders. In attendance: G. B. Dodd, L. S. Fiscus, E. J. Teal, F. J. Wolf, W. R. Schoener, Sal Ellis, R. C. Hubbard.

THE HUBINGER COMPANY, 601 Main St., Keokuk, Iowa. Booth 3. Products: Samples of corn syrup, starches. In attendance: R. L. Krueger, A. M. Robinson, G. Roy Underwood, J. E. Boyle.

THE HUGE COMPANY, St. Louis, Mo. Booth 103

A. HUHN MANUFACTURING CO. 3915 Hiawatha Ave., Minneapolis 6, Minnesota. Booth 25. Huhn starch dryer & cooler catalogs. In attendance: Alex G. Huhn, Bob Maday, Frank J. Novack.

I. D. COMPANY. 150 Spring Street, New York, New York. Booth no. 205. Containers imported from England for packaging. Containers, trays, baskets, compotes. In attendance: A. S. Katzman, A. B. Katzman, S. L. Kaye, Leonard Bernstein, Victor Cowley, Leon Bergsman, Max Rehns.

J. A. JOFFEE & CO. 208 South 13th Ave.. Mount Vernon, New York. Booth 513. Sugar decorations, icing flowers, decorated chocolate & candy novelties. In attendance: Julian A. Joffe, Roland D. Joffe.

H. KOHNSTAMM & CO., INC. 11-13 East Illinois Street, Chicago, Illinois. Booth 207. Atlas brand certified colors in powder, flavoring extracts and concentrated oils. Paste and plastic cubes for all types of confections. In attendance: Robert H. Pulver, Wm. H. Nelson, Justin Pulver, Charles J. Beringer, Franklin P. Hlavin, Thomas O'Brien, Joseph Torter, Mortimer Moss, Andrew Torter and Lewis F. Coplan.

A. KLEIN & CO., INC. 113-119 West 17th St., New York 11, New York. Booth 26. Fancy boxes for the confectioner exclusively. In attendance: Joseph Ehrenfeld, Mrs. Joseph Ehrenfeld, William Michaelis.

LAMBORN & COMPANY, New York, N. Y. Booth 7

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SUCKER MACHINE
You can pay for this machine out of the profits you'll make producing from 300 to 800 high quality suckers a minute. See it at the
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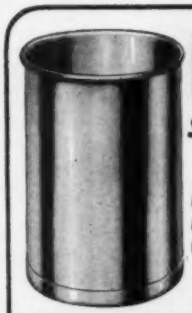

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J. M. LEHMANN COMPANY, INC. 550 New York Avenue, Lyndhurst, New Jersey. Booth 501. Flow chart layout and Schematics will be available with display of chocolate refiners 5 & 3 roll sight-O-matics, cocoa liquor mills, mixers, tempering machines, storage and tempering kettles, conches, emulsifiers, cracker & fanner, sieving and strainging machinery, coating plants, automatic feed unit to enrobers, automatic hollow mold plants and pulverizers. In attendance: C. B. Hoffman, J. M. Sarlat, C. Dittmann, A. E. Hawkins, G. R. Linden, H. Mierswa, C. Page.

LE ROY'S INTERNATIONAL RESEARCH LABORATORIES. State Highway 88, Point Pleasant, New Jersey. Booth 6. Peppy Dipper. In attendance: Dr. Adrian Le Roy, G. E. Le Roy, Peppy Le Roy, Alvin R. Wagner, Mrs. A. Le Roy, Sr.

LYNCH CORPORATION. 2304 Crystal Street, P. O. Box 271, Anderson, Indiana. Booth 407. Model PB-RA Wrap-O-Matic wrapping machine designed expressly for the candy and novelty industry. In attendance: A. V. Petersen, R. N. Craven, H. R. Kalf.

THE MANUFACTURING CONFECTIONER. 418 No. Austin Blvd., Oak Park, Illinois. Booth 30. The Manufacturing Confectioner, Candy Packaging, Candy Equipment, Purchasing Executives' Number, Books, Candy Buyer's Directory. In attendance: P. W. Allured, Stanley Allured, Wesley Childs, James Allured, Allen Allured, May Seelman.

McCARTER IRON WORKS, Inc., Norristown, Pa. Booth 19

MERRILL, LYNCH, PIERCE, FENNER & BEANE, New York, N. Y. Booth 10

MICHIGAN LITHOGRAPHING CO. Grand Rapids, Michigan. Booth 11. Fancy box wraps. In attendance: G. W. Mathison, P. Decker, Don Rickie.

MILPRINT, INC. 4200 N. Holton St., Milwaukee 1, Wisconsin Booth 302. Full line of candy packages—wrappers, bags, folding cartons, and overwraps. In attendance: William Heller, Sr., Lester Zimmerman, Roy E. Hanson, James Heller, Roy W. Lundberg, Harry Jones.

MOLDED FIBERGLASS TRAY CO. Linesville, Pennsylvania. Booth 107. Plastic starch trays, drying trays, and stock boxes. In attendance: J. W. Moore, Harold Ogust, Carl Hornkohl.

MURNANE PAPER COMPANY. 1510 North Kostner Avenue, Chicago 51, Illinois Booth 29. "Lint-Free chocolate and white paperboard base cards for candy bars, boats and nest partitions and dividers—plain and "H. T. Non-Stick" Treated. In attendance: J. H. Murnane, J. Hobie Murnane, Frank Keegan, Frank Murnane, George Kells, Walter Flintnip, Bob Walsh, Jack Witt, Ralph Hartmann.

NATIONAL EQUIPMENT CORPORATION. 153-157 Crosby St., New York 12, New York. Booth 31, 32, 33, 34. Short case sealer, WCP wrapper, batch mixer, continuous cooker, sugar sander, bon bon enrober, pump bars. In attendance: Joseph Greenberg, Sidney Greenberg, W. H. Kopp, George Perkins, M. M. Guggenheim, Jack Debrovner.

THE NULOMOLINE DIVISION, AMERICAN MOLASSES COMPANY. 120 Wall St., New York 5, New York. Booth 210. Displaying heat resistant candies and candies for year-round production, with emphasis on Television candies. Samples of convertit, nulomoline, grandma's old-fashioned molasses, and other special invert sugar syrups will be displayed. In attendance: Karl Fromm, Jack Calder, Fred Jannsen, Frank Trager, Andrew Taylor, L. Grimmins, R. J. Sasseman, Jr., Jas. A. King.

PACKAGE MACHINERY COMPANY. W. Chestnut Street, East Longmeadow, Mass. Booth 301. Completely new Forgrove high-speed machinery for producing filled plastic candy plus Forgrove model 22-B hard candy twist wrapper with automatic hopper feed. In attendance: R. L. Putnam, L. A. Curtis, J. B. Garrett, J. M. Chalfant, W. H. Keil, W. A. Rangnow, J. A. Egan, R. A Butler, W. J. Maybury, Jr., H. A. Nussbaum, George Woody.

PEERLESS CONFECTIONERY EQUIPMENT CO. 158 Greene St., New York, New York. Booth 409. Gabel machines, automatic batch roller, rope sizer, high speed toffee cooker and mixer. In attendance: S. Schwartz, N. Schwartz, Otto Hansel, Hans Kruse.

PENICK & FORD LTD., INC. 420 Lexington Ave., New York 17, New York. Booth 2. Products from corn used by the confectionery industry. In attendance: D. P. O'Connor, H. A. Horan, O. H. Tousey, P. G. Wear, S. F. M. Maclaren, F. J. McCrossom, L. S. Poer, J. A. Kooreman, W. J. Brown, Arthur F. Brooks, Donald C. Cahoon, Norman Vance Jr., D. W. Johnson.

QUINCY PAPER BOX CO. 230 North Third St., Quincy, Illinois. Booth 9. Fancy candy boxes. In attendance: Paul Jochem, Maurice Jochem.

RIEGEL PAPER CORPORATION, P. O. Box 170, Grand Central Station, New York 17, N. Y. Booth 1A

ROSS & ROWE, INC. 50 Broadway, New York 4, New York. Booth 1. Yelkin standardized lecithins. Fries flavors. Placto milk and cream products. In attendance: W. F. Schlesinger, J. E. Lynch, O. M. Stout, H. R. Smith.

THE ROTARY MACHINE COMPANY, INC. 4801 N. Broad Street, Philadelphia 41, Pennsylvania. Booth 509. Rotary molder machine. In attendance: Gordon H. Wilcox, David Roberts, Frank Reichel, Barnard Guy, Dorothy Wilcox, Nancy Wilcox, Wm. Hannah.

SAVAGE BROS. CO. 2638 Gladys Ave., Chicago 12, Illinois. Booth 206. Savage continuous hard candy cutter. Savage all stainless steel marshmallow beater. Savage model S-48 Portable Fire Mixer. 12" and 18" Copper revolving pans. In attendance: R. J. Savage, M. A. Savage, M. J. Linden, R. W. Emerson, W. P. Halpin.

ROBERT E. SAVAGE CO., Chicago, Ill., Booth 27

F. J. SCHLEICHER PAPER BOX CO., St. Louis, Mo. Booth 303

SETTER BROTHERS, Cattagarus, N. Y. Booth 12

SHEAR-PRINZ ASSOCIATES. 14 East Jackson Blvd., Chicago 4, Illinois. Booth 1G. "Starfire Bows" "Spedi-Wraps". Special design bows and wraps. In attendance: Irving Prinz, Leon Shear, Bill Holzberger.

W. C. SMITH & SONS, INC. 2539 N. 9th St., Philadelphia 33, Pennsylvania. Booth 503. 5" choc. coating machine, caramel & nougat cutting machine, assorted center box packing machine, chocolate tempering kettle with mould filling attachment. In attendance: W. C. Smith, W. C. Smith, Jr., John E. Lockton, S. Chas. Jacques, Les Drusendahl, Ted Merckens, B. Blake, S. Buchanan.

A. E. STALEY MFG. CO., Decatur, Ill. Booth 304 Products from Corn

SUGAR INFORMATION, INC. 52 Wall St., New York 5, New York. Booth 38. Important messages which can be adapted to confectioners' advertising and merchandising will be available along with back-ground material of special interest to candy makers and retailers. In attendance: David Quinlan, Margaret Zeller, and Neil Kelly.

SUNKIST GROWERS. 616 East Grove Street, Ontario, California. Booth 306. Pectin, oil of lemon, oil of orange. In attendance: D. R. Thompson, L. C. Gallagher, C. E. Scovern, Jr., E. L. Rhoads, C. A. Walker, P. T. Wood, J. P. Hamman, E. S. Chrapla.

SUPERMATIC PACKAGING CORPORATION. 132 Pacific St., Newark, and chocolate wrapping machines. Model 2100-2350-2120-2160. In attendance: Raymond Farina, Oreste Marfuggi, Amerigo D'Agostino, Caeser Mascherin, Louis Izzo, Giancarlo Lambertini, Sam Farina.

SYLVANIA DIVISION, AMERICAN VISCOSE CORPORATION. 1617 Pennsylvania Blvd., Philadelphia 3, Pennsylvania. Booth 507. Sylvania cellophane wrapped domestic confectionary packages and an interesting display of European packages. In attendance: John Adrian, R. E. Glenn, A. J. Horgan, Howard Price, W. H. Robie, C. R. Shaffer, F. W. Spannagel and W. B. Zemann.

TEE-PAK INC., PLASTIC FILMS DIV. 3520 S. Morgan St., Chicago, Illinois Booth 21. Printed Saran & printed Polyethylene, both single and double wound. Unilox printing (printing between plies). In attendance: F. J. Pool, L. J. Cullen, Wm. Diffenderfer, L. P. Wight, J. R. Moakler.

C. TENNANT, SONS & CO. of NEW YORK. 100 Park Avenue, New York 17, New York. Booth 307. Nielsen chocolate coaters, Nielsen fondant coaters, Nielsen ice cream coaters. Theegarten continuous vacuum cookers. Theegarten automatic batch-rollers, Theegarten Sugar-mass handling equipment. Barraclough and Construction Industrielles de Precision candy wrapping and packaging machinery In attendance: Dr. Ernst M. Huttrer, A. E. Nielsen, James W. Knapp, Walter H. Kansteiner, Walter H. Kansteiner Jr., Elmer T. Rennicke.

TRI-STATE PLASTIC MOLDING CO., 505-4th St., Henderson, Ky., Booth 1F

C. E. TWOMBLY CO. Medford, Mass. Booth 511 Paper foil-glassine.

It's tough!
It's sanitary!
It weighs less!
It's WEAR-EVER'S

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HINGED COVER

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DOLLY has hard-tread tires, 4 ball-bearing wheels.

CHECK THESE FEATURES

Sanitary open bead, no cracks or crevices
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Friendly to food, won't pick up odors
Light weight, easy to handle

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UNION CONFECTIONERY MACHINERY CO., INC. 318 Lafayette St., New York 12, N. Y. Booth 36, 37. In attendance: Sidney Greenberg, Barbara Green, Charles Greenberg, Irving Debrovner, Jack Debrovner.

UNION SALES CORP. Columbus, Indiana. Booth 204. Products from corn. In attendance: E. B. Pulse, G. W. Anderson, D. Foster, W. Bissell, P. Gourno, C. Grathen, W. Naylor, E. Jaross, V. F. Thorne.

VACUUM-RACINE 15-17 Park Row, New York 38, New York. Booth 201, 202, 310. U. S. made machines by Vacuum and Racine, as well as European made machines by Bauermeister, Hansella, Mikrovaerk, Jensen, Bramigk, and Sapal. Joseph L. Raffetto, George Scheu, George Hislop, Harold Davis, Jack Green, Ted Merckens, Wm. Genich, Eberhard Berten, Carl Magnussen, Dick Bird.

VOSS BELTING & SPECIALTY COMPANY. 5645 N. Ravenswood, Chicago, Illinois. Booth 106. HiGloss, Satyn Gloss, Kleer Gloss, Hi-Lustre, Teflon, batch roller belts, caramel boards, vosstex & cotton belting. In attendance: Robert J. Voss, A. T. Stevens, Joseph H. Voss, Ted Merckens, Frank A. Gusinde, Al Horka, Warren E. Frandsen, Harry Jenks, Edward Kordt.

CHAS. WEINHAGEN & CO., St. Paul, Minn. Booth 17.

WERNER MACHINERY CO., Grand Rapids, Mich., Booth No. 13.

WHITE STOKES COMPANY INC. 3615 South Jasper Place, Chicago, Illinois Booth 5. Superkreme, whitstojel, fondax, whisto solids. In attendance: D. M. Moseley, W. W. Kearney, C. A. Dillon, W. A. Alexander, E. J. Stevenson, A. N. Tzakis.

WRIGHT MACHINERY COMPANY. Durham, North Carolina. Booth 35. Model M-3 bag master system. In attendance: I. P. Ritschel, J. B. Mahoney, W. T. Vaughan, T. E. Perry.

T. C. WYGANDT COMPANY, New York, N. Y. Booth 101

Trade Press

Candy Industry, New York, N. Y. Booth No. 408.

The Confectioner, Milwaukee Wis. Booth A

Confectionery-Ice Cream World, New York, N. Y. Booth No. 39

International Confectioner, New York, N. Y. Booth No. 105

The Manufacturing Confectioner, Chicago, Ill. Booth No. 30

Confectioners Journal, Philadelphia, Pa. Booth No. 102

Exposition hours

Monday, June 6
2 p.m.–8 p.m.

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1 p.m.–6 p.m.

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Further studies on the shelf life of coconut bars

by H. B. COSLER, *Quartermaster Food and Container Institute*

At the Eighth Annual Production Conference of the Pennsylvania Manufacturing Confectioners Association, held at Franklin and Marshall College in April 1954, the writer gave a paper on the results of a 12 month storage study on the Shelf Life of Coconut Bars. This paper was published in full in some of the trade magazines. Eight bars made on different formulations had been prepared for these storage studies.

From the results after one year of storage it was concluded that if coconut bars were prepared from high quality coconut, a long shelf life could be expected. No off-flavors had developed after one year storage at room temperature in containers with loose covers, at 70° F. continuous storage in air-tight containers, or after 9 months at 100° F. continuous storage in air-tight containers.

Since the paper was written, the results of the 2-year storage study at 70° F. in air-tight containers are available. The rating given by the taste panel is listed in the following table along with the initial and 1-year ratings. If formulations are desired for the 8 bars, these can be obtained from the published paper on "Shelf Life of Coconut Bars." Acceptance ratings under the various storage conditions may also be obtained from the same paper.

The ratings are on the 9 point quality scale.

TABLE I

BAR ACCEPTANCE RATING

	Initial	After 1 Year	After 2 Years	% Dislike After 2 Years
Ac	6.3	6.5	6.7	14
As	6.9	6.9	6.7	14
Bc	7.6	7.4	7.6	0
Bs	7.3	7.4	7.4	4
Cc	6.5	6.2	5.8	32
Cs	6.6	5.9	5.8	32
Dc	6.8	6.0	6.2	29
Dh	6.6	6.0	6.8	7

The percent dislike is the percent of testers rating the product 5.0 or lower where 5.0 is neither like nor dislike.

It can be seen from these results, that except for the Cc, Cs and Dc bars there has been no decided drop in acceptability and although the drop for these 3 bars is not too significant, a higher percentage graded them 5 or below. However, all of the bars are in the acceptable range even after 2 years of storage.

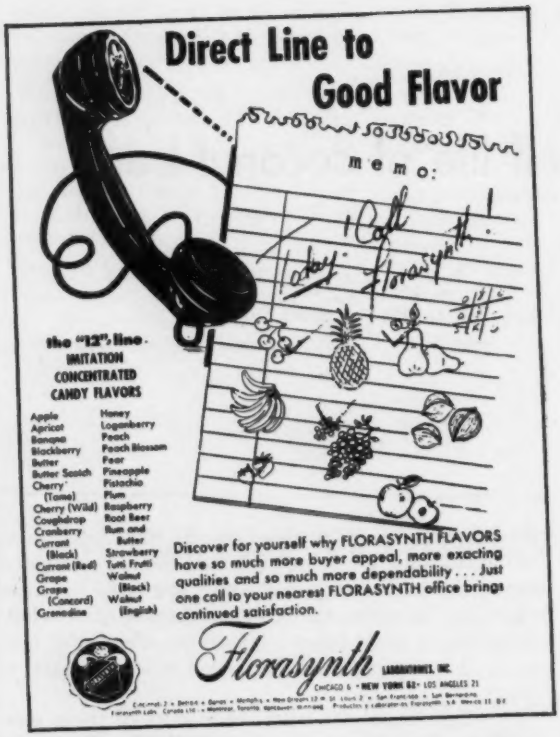
We might conclude from the results of these storage tests, that the problem of shelf life of coconut bars had been solved. However, this is not the case.

Coconut bars for another test were made in May by a manufacturer who takes pride in the cleanliness of his plant. The bars were taste-tested, and the remaining, about 20 bars of each, were stored at room temperature in loosely covered boxes. Several days in June and July were above 90° F. In August these bars were examined and were found to have a moldy taste and smell. When the bars were broken apart the mold growth was evident in the air pockets between the coating and center.

We gave some of the bars to our Microbiology Department to try to determine the type of mold. By culturing it was found to be typical of the order Mucorales, a common mold widely distributed.

The manufacturer of the bars was contacted for two reasons, first, to try to determine the source of the mold, and secondly, to warn him so that he could take measures to prevent this from recurring. As all the bars furnished to us seemed to have developed the mold growth, it would follow that the entire batch of centers became inoculated with the mold spores either from one of the raw materials or from standing exposed to the air for too long a period, such as overnight or longer. The exact cause was not determined, but this manufacturer expects to keep closer supervision over the quality of coconut used and, in addition, to heat any part batches car-

This paper reports research undertaken in cooperation with the Quartermaster Food and Container Institute for the Armed Forces, and has been assigned number 513 in the series of papers approved for publication. The views or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the views or indorsement of the Department of Defense.



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ried over from the previous day before molding into bar shape. He had been cleaning his mixing and molding equipment after stopping production in the evening. He now intends to steam it again before starting the day's production.

From this experience it became evident to us that in addition to specifying a high quality coconut, we must provide further safeguards to insure a quality coconut bar of good stability. Safe time and temperature requirements to kill mold spores are listed in the following table.

TABLE II

Temperature ° Fahr.	Time Seconds
140	360
150	99
155	54
160	28
165	15
170 or higher	8

A new paragraph will be added to the specification for coconut bars or discs to read as follows:

> "After the coconut has been added and mixed with the other ingredients, the mixture shall be maintained at one of the temperatures for the corresponding time in accordance with the above table. Not more than 1 hour shall elapse between the completion of this and the casting or molding into bars or discs."

In our paper given at the Pennsylvania Production Conference we made the statement that the coconut bars developing the moldy smell and taste seemed to occur only with the bars made by manufacturers using the cold process and that this was probably a coincidence as our further tests seemed to prove. From our subsequent experience we now believe that this was true and not just a coincidence and that it will be necessary for the manufacturers using the cold process to maintain temperatures as listed above in order to safeguard their bars against mold growth. This precaution is in addition to the use of high grade coconut. A further safeguard would be to steam or heat the surface of the mixing and molding equipment or wash with a permissible fungicide prior to use.

Since starting the studies on coconut bars more than two years ago, a few people in this organization have mentioned to me that they had purchased coconut bars which had an off-taste.

Manufacturers of coconut bars for the commercial trade should take advantage of the prior and the more recent storage studies on coconut bars conducted by the Quartermaster Food and Container Institute to make sure the consumer receives a bar that maintains its original quality for several weeks after manufacture.

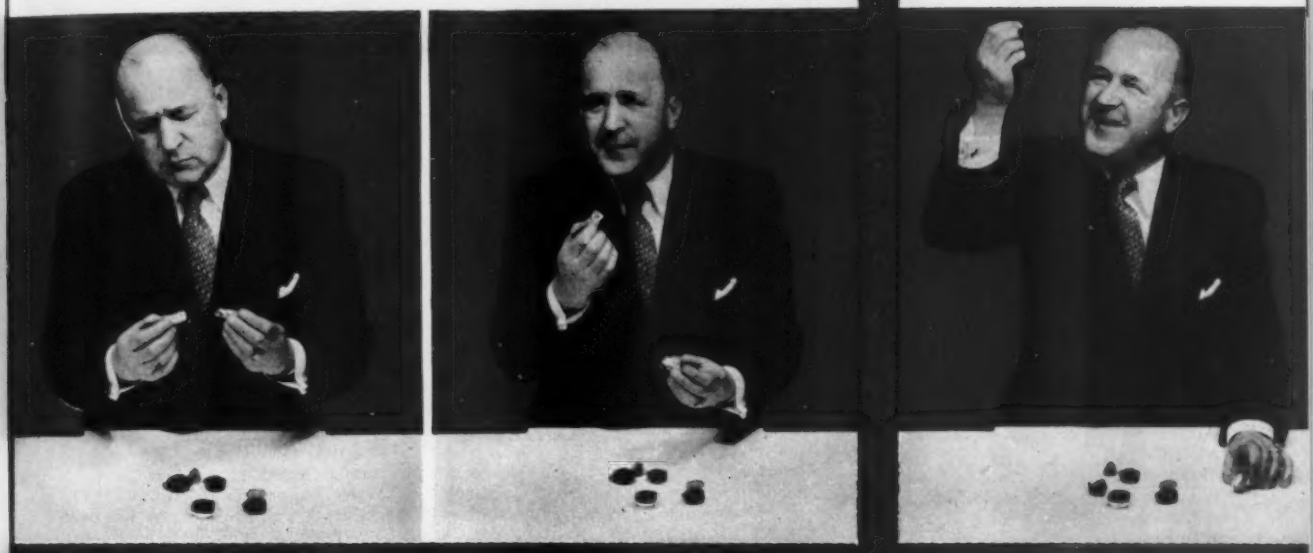
Cosler, H. B. Studies on the Shelf Life of Coconut Bars Manufacturing Confectioner, Vol. XXXIV No. 6, June 1954.

Cosler, H. B. Shelf Life of Coconut Bars International Confectioner, Vol. 64 No. 8, August 1954.

a matter of discriminating choice—
for top quality, always use

AMAIZO

CORN SYRUPS and STARCHES



The discriminating manufacturer in top quality confections knows there is no compromise . . . best results are always achieved with AMAIZO **corn syrups** and **starches.**

Each one custom made and designed to do the most effective and economical job possible for its given use, AMAIZO **syrups** and **starches** contribute the most to appearance, flavor, texture and shelf life.

AMAIZO **corn syrups** and **starches** are the products of intensive and continuous research and development in the American Maize laboratories. The capable American Maize Technical Service Staff will help you get the most out of them and assist you in any formulation or production problem you may have. Ask today for complete information on how AMAIZO products can help your product.

Some leading AMAIZO products

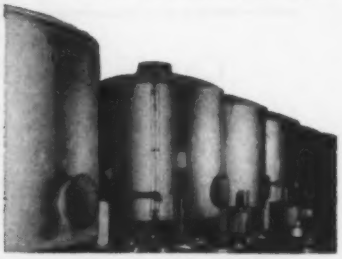
CORN SYRUPS

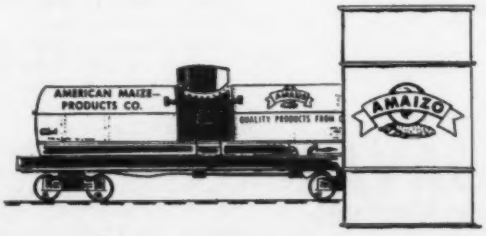
PURE FOOD POWDERED STARCH

FRODEX (corn syrup solids)

THIN BOILING STARCHES

SPECIAL MOULDING STARCHES





AMERICAN MAIZE-PRODUCTS COMPANY

250 PARK AVENUE • NEW YORK 17, N. Y.

ATLANTA • BOSTON • BROOKLYN • BUFFALO • CHICAGO • DENVER • PHILADELPHIA • LOS ANGELES
MEMPHIS • FORT WORTH • PITTSBURGH • PORTLAND • ST. LOUIS • ST. PAUL • SAN FRANCISCO • SEATTLE

The MANUFACTURING CONFECTIONER'S

Candy Clinic

The Candy Clinic is conducted by one of the most experienced superintendents in the candy industry. Some samples represent a bona-fide purchase in the retail market. Other samples have been submitted by manufacturers desiring this impartial criticism of their candies, thus availing themselves of this valuable service to our subscribers. Any one of these samples may be yours. This series of frank criticisms on well-known branded candies, together with the practical "prescriptions" of our clinical expert, are exclusive features of The MANUFACTURING CONFECTIONER.

Marshmallows; Fudge

Code 6B5
Sponge Candy
4½ ozs. 19¢
(Purchased in a department store, Chicago, Ill.)

Appearance of Package: Good.
Size: Good.
Wrapper: Cellulose wrapper printed in brown and white. Overall print of old fashioned man and lady.
Sponge:
Color: Good.
Texture: Good.
Taste: Good.
Remarks: The best sponge candy at this price we have examined this year. Very tender eating and a good flavor.

Code 5E5
Small Chocolate Eggs
No weight stated 59¢
(Purchased in a department store, Chicago, Ill.)

Appearance of Package: Good.
Container: Gold mesh bag. Eggs are wrapped in colored foils.
Chocolate: Good.
Molding: Good.
Gloss: Good.
Taste: Good.
Center: Good.
Remarks: Highly priced at 59¢. Suggest name, weight, address and ingredients be printed on package to avoid trouble with Food & Drug Dept.

Code 6A5
Chocolate Coated
Cherries
1 lb. 89¢
(Purchased in a drug store, Indianapolis, Ind.)

Appearance of Package: Good.
Box: Two layer type, top white printed in red, gold and green. Imprint of cherries in colors. Cellulose wrapper.
Appearance of Box on Opening: About 50% of the cherries were broken.
Coating: Dark.
Color: Good.
Gloss: On pieces not broken, good.
Strings: Good.
Taste: Good.
Centers:
Cherries: Good.
Cordial: Good.
Taste: See remarks.
Remarks: A well made cherry but center lacked flavor. Suggest a good cherry be used in fondant to improve the taste as the center lacked flavor.

Code 5B5
Chocolate Coated
Hand Roll Creams
10 ozs. $1.50
(Purchased in a department store, Chicago, Ill.)

Appearance of Package: Good.
Box: Two layer type, slip cover, red, name printed in silver. Tied with a band and bow of red ribbon. Cellulose wrapper.
Appearance of Box on Opening: Good. There are 10 one ounce pieces, each wrapped in colored printed paper-backed foil.
Chocolate Coating: Dark.
Color: Good.
Gloss: Good.
Strings: Good.
Taste: Good.
Centers:
Black Walnut Cream: Good.
Cherry Creams: Good.
Maple Pecan Creams: Good cream, cheap imitation flavor.
Toasted Coconut Creams: Good.
Opera Creams: Good.
Assortment: Too small.
Remarks: Suggest more flavors be added to improve the assortment. At the price of this candy, pure maple sugar should be used. Very highly priced at 10 ozs. for $1.50.

Candy Clinic Schedule For the Year

JANUARY—Holiday Packages; Hard Candies
FEBRUARY—Chewy Candies; Caramels; Brittles
MARCH—Assorted Chocolates up to $1.00
APRIL—$1.00 and up Chocolates; Solid Chocolate Bars
MAY—Easter Candies and Packages; Moulded Goods
JUNE—Marshmallows; Fudge
JULY—Gums; Jellies; Undipped Bars
AUGUST—Summer Candies and Packages
SEPTEMBER—Bar Goods; 5¢ Numbers
OCTOBER—Salted Nuts; 10¢-15¢-25¢ Packages
NOVEMBER—Cordial Cherries; Panned Goods; 1¢ Pieces
DECEMBER—Best Packages and Items of Each Type Considered During Year; Special Packages; New Packages

Code 6C5
Milk Chocolate Pops
2 ozs. 39¢
(Purchased in a department store, Chicago, Ill.)

Appearance of Package: Good.
Box: Folding box printed in red, yellow and brown. Cellulose window. Box contained 10 chocolate pops on sticks.
Milk Chocolate: Good.
Molding: Good.
Remarks: A very good novelty package. Should be a good seller.

Code 6D5
Toasted Coconut Marshmallows
1 lb. 39¢
(Purchased in a department store, Chicago, Ill.)

Appearance of Package: Fair.
Container: Polyethylene bag, paper clip on top printed in red.
Marshmallow:
Coconut: Good.
Marshmallow:
Color: Good.
Texture: Good.
Taste: Good.
Remarks: The best toasted marshmallow we have examined this year at this price. Well made and good eating. Cheaply priced at 39¢ the pound.

Code 6E5
Maple Mallow Cream Bar (Egg)
1 oz. 5¢
(Purchased in a chain drug store, Oak Park, Ill.)

Appearance of Egg: Good.
Size: Good.
Wrapper: Paper backed foil wrapper printed in red, white and blue.
Egg:
Coating: Light, Fair.
Center:
Color: Fair.
Texture: Good.
Taste: Fair.
Remarks: Egg is not up to the standard of other 5¢ marshmallow eggs we have examined this year.

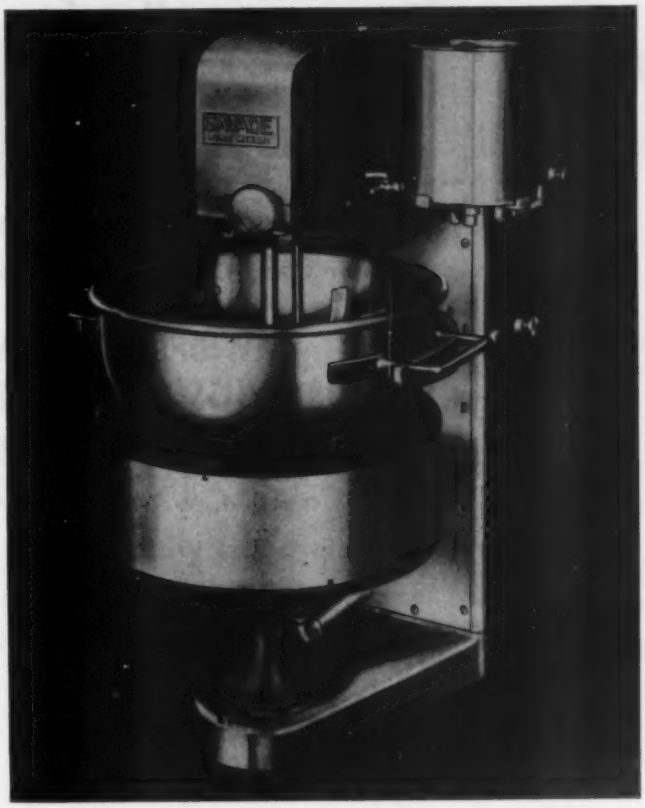
Code 6F5
Marshmallow Rabbits
10 pieces 5 ozs. 25¢
(Purchased in a chain drug store, Oak Park, Ill.)

Appearance of Package: Good. Rabbits are in a chocolate board tray. Cellulose wrapper printed in red, white and yellow.
Rabbits:
Coating: Light, Fair.
Center:
Color: Good.
Texture: Tough.
Taste: Fair.
Remarks: We cannot complain too much about a package of this kind that retails for 25¢. We often wonder how some manufacturers stay in business.

SAVAGE LATEST FIRE MIXER

MODEL S-48

Thermostatic Gas Control—Variable Speed



The Savage Latest Fire Mixer, Model S-48, is Streamlined and Sanitary and has many new features and conveniences:

Automatic Temperature Control
Variable Speed from 30 to 60 RPM
Break-back within floor space 32" x 48"
Aluminum Base and Body Castings
Atmospheric Gas Furnace with Stainless shell
Removable Agitator, single or double action
Stainless Cream Can and Stainless Drip Pan
Copper Kettle 24" diameter 12½" deep or 16" deep

You can save labor and obtain uniform batches by setting the thermostat for degree cook desired. It cooks and mixes batches of caramel, peanut brittle, peanut candies, fudge, nougat, gum work, and with double action agitator is ideal for coconut candies and heavy batches.

Your inquiry invited

SAVAGE BROS. CO.
2638 Gladys Ave. Chicago 12, Ill.

Since 1855

The "Cream" of Nougat Kremes

NU-KREME

THE MOST OUTSTANDING DEVELOPMENT
for use in making the following:

WHIPPED CREAMS
SEA FOAM KISSES . . . SHORT NOUGATS
HAND ROLLED CENTERS . . . SWISS HAND ROLLS

NU-KREME is a light, white, highly tender and more mellow egg product which insures unusually zestful taste and improved character in finished candies.

NU-KREME . . . First Again !

In the past, NU-KREME has brought the Candy Industry such valuable products as Soft Flowing Creams, Short Turkish Nougats, Swiss Hand Rolls and an improved Cut Slab Marshmallow . . . NOW . . . A truly *Outstanding* Whipped Cream that will stimulate business for YOU . . . A Real Sales Booster.

Write, Wire or Phone for Your Formula Today.

Flavor *Unsurpassed*

BURKE PRODUCTS CO. INC.

SOLE MANUFACTURERS

BURKE PRODUCTS CO., INC.

317 W. HUBBARD ST. CHICAGO 10, ILLINOIS

Highway location clicks for Naas Candies

by CHET SPINK

The long, low ranch-style building of Naas' Candies helps give the home style impression of the highest quality candy. Ample parking space, and the location on a main highway, attracts vacation travelers.

Moving outside of the city into their own attractive building with plenty of parking space, proved to be a great success for Naas Candies, of Santa Clara, Calif.

Owned and operated by founder Henry C. Naas and his son, Robert H. Naas, the firm in little more than 15 years has grown from a backyard location to a plush, modern operation attracting customers from a very large area.

Started in 1930 at Mr. Naas' San Jose home as the depression gripped many businesses, the firm has expanded to a $75,000 building on picturesque El Camino Real, where six employes are needed to handle the big holiday rushes.

Naas candies are based on the experience of Henry Naas, who got into the business at the age of 14 as a candy maker working for confectioners in the San Jose area. He decided to manufacture his own wholesale line when the depression years opened the way for small business operations with a minimum of overhead. "I began with a small line, and quickly learned it was a money-making program," he said.

Although he was convinced a candy business where he controlled both manufacturing and retailing was the best kind of operation, Mr. Naas expanded to a larger location in San Jose in 1936.

Mr. Naas and his son, who grew up in the business, built in their present location in 1947. The long, low ranch-style building is neat and clean. Its appearance is in itself one of the important merchandising features of the business.

"People who want good candy

candy- it's good!

candy with CLINTON -it's better!

Just ordinary candy — anybody can make. But the best candymakers know that really *fine* candy . . . candy with lip-smackin' taste and "give-me-more" texture . . . must have top quality ingredients . . . like Clinton's corn syrup.

Clinton corn syrup prevents crystallization, controls body, texture or chewiness and extends shelf life.

From gum drops to candy canes and from jelly beans to bon bons, Clinton products from corn — syrups, starches and dextrose — will give your products what it takes to make them — not just good — but best!

. . . *and remember* technical service in connection with your specific problems is available upon request

Quality products

FROM THE WORLD'S CORN CENTER

CLINTON

CLINTON FOODS INC.
Corn Processing Division
CLINTON, IOWA

are very particular about the appearance of a candy store", Robert Naas said. "The store should be clean and attractive on the outside, and the interior must be light, airy and spotless. "The exterior also should have a "homey" touch which seems to add to the feeling of quality, homemade candies", he said.

Built with a long, sloping roof finished with wooden shingles, the homelike appearance is emphasized by heavy shutters, flowers, a redwood stake fence and a pleasant tiled front porch. Two heavy brass coach lanterns on the front wall are flanked by multi-pane windows. Built on a corner lot with a 150-foot front and 200 feet deep, the stucco building is set back about 50 feet from the four-lane highway, leaving a broad parking area in front of the building resembling the broad front yard of the California-style ranch house. Geranium beds flanking the broad front porch also add to the homelike touch. The flower beds are located behind low, neat sandstone walls.

The redwood stake fence sets off the building and yard, and at the end opposite the corner a large, well lighted and colorful sign advertises the firm's products. A neon-lighted cutout letter sign on the roof of the building says "Naas Candies".

Two broad windows on each side of the shop's double glass doors permit an unobstructed view of the building's gleaming sales room.

Predominantly white, the sales room is large and uncluttered. Enclosed between the business office at one end and the dipping room at the other, the sales room is about 18 by 50 feet long. With the firm's own creams, fudges and other soft candies holding the spotlight in the center location, candy is displayed in all-glass cases set on a white, waist-high counter. The candy display is attractively set against a background of special Candylane wallpaper and windows trimmed with fluffy white curtains.

The floor covering is white and gray asphalt tile squares and the ceiling is white. The area is lighted by indirect fluorescent fixtures, augmented by glass-covered fixtures set in the ceiling. Although

for QUALITY CANDIES *at* LOW COST

use HYFAT

THE ORIGINAL HYDENSITY SWEETENED CREAM

TAKES THE PLACE OF BEST QUALITY CREAM and SUGAR

HYFAT is a Hydensity Sweetened Cream of golden color, high butter fat content, smooth texture and high total solids. Its fresh flavor and uniformity are controlled to give you certain results with every batch of fudges, caramels, chews, puddings and other confections you produce. Write for formulas.

DOES NOT REQUIRE COLD STORAGE

HYFAT is the ideal and safe cream insurance for all seasons. It is dependable in quality and ready to use when needed. Used for many years by discriminating confectioners to produce highest quality confections. Now available in any quantity. Let us quote your needs.

EASY TO USE

Simply release contents from tub, peel back parchment paper and cut off as much as you need. Place in kettle and note the rapid mixing of batch. Due to our exclusive Hydensity process, the sweetened cream flavor of HYFAT is carried right through to your finished confections. Customers recognize this superb fresh flavor instantly.

BASIC INDUSTRIES, INC.

919 N. MICHIGAN AVE., CHICAGO 11, ILL.

the building stays relatively cool through the warm summer months because of a large attic, the dipping room is airconditioned to provide close temperature control.

Potted palms at each end of the display counter and large green rubber plants against the front wall also add to the homelike feeling of the sales room. The Candylane wallpaper covers only the back wall. Both side walls and the front wall are white stucco.

White uniforms that are fresh and clean are a "must" in the entire operation, particularly in the sales room, Robert Naas said. "We go to a lot of trouble to see that the building is clean and neat, but soiled uniforms can destroy that atmosphere completely," he said.

Although the building and maintenance spearhead the firm's merchandising campaign, Robert Naas said holiday decorations come a close second in creating a sales drive. Special displays for every holiday are set up in the sales room, with emphasis on the two big windows adjoining the front entrance.

"Of course Christmas and Easter are our two biggest holidays here, and we go all out for them. For Easter we set up a giant Easter egg scene made with granulated sugar. A church scene is set up inside the big hollow egg, and smaller eggs are set around the outside of the large egg. "We set up a large plaster of Paris jack-O-lantern for Halloween, and use turkeys and other timely figures for Thanksgiving."

Through the summer months when passing vacationers stop in for candy they are greeted by a large summer panorama built around a merry-go-round and featuring tiny human figures made with peanuts and pipe cleaners. The displays are made by the senior member of the firm, as a hobby that also pays off as a business attraction.

"We spend quite a bit of money on those displays," he said. "But they're well worth it. And I get a great deal of satisfaction from the pleasure they give our customers.

"People come in from miles around to see our holiday displays, and it isn't unusual for people to come in, even though they don't want to buy anything, just to see the windows."

The firm's candy boxes are designed especially for the location and are modern and neat. The Naas name, with the slogan, "It's Fresher," are printed across the left half of the box, and a line drawing of the building with the address is printed in the lower right corner. Gift wrapped boxes are sealed in cellophane, and a ribbon wrap adds to the neat packaging effect.

There is ample room in the kitchen for producing the kind of candy that has made the Naas Candies label well known to candy lovers. Set up in an area 18 by 100 feet, the kitchen is equipped with a Hobart mixer, a three-foot cream beater, and a custom made puller which will handle a 40-pound batch. Hard candies also are produced in the Naas kitchen, A popular package is the one pound pack of old fashioned hard candy in 13 flavors.

Besides a six foot marble slab for working soft candies, there are two eight foot water cooled steel slabs. Cooking is done on a Savage

to assure finer candies

USE EGG WHITE SOLIDS
(EGG ALBUMEN)

flake, milled or spray-dried

save time & money in

EASY SHIPPING
EASY HANDLING (*no defrosting*)
EASY STORING (*long shelf-life, no refrigerating*)
EASY RE-HYDRATING

and produce the high volume and stable foam so necessary in the manufacture of the finest candies

MEMBERS

Armour & Company
Blue Diamond Egg Company
Butterfield Produce Company
Commercial Creamery Company
Continent Frozen Foods Corp.
Edson, Pratt & Riley, Inc.
The Emulsol Corporation
Henderson Produce Company
Henningsen, Inc.
Kraft Foods Company
Mid-West Produce Company
Nebraska Egg & Poultry Company
Ocoma Foods Company
A. J. Pietrus & Sons
B. L. Sarett
Seward Egg Company
The Seymour Packing Company
F. M. Stamper Company
A. Sturm & Sons
C. A. Swanson & Sons
Swift & Company
Tranin Egg Products Company
Washington Cooperative Farmers Assn.
Wilson & Company

EGG SOLIDS COUNCIL
A Division of the Institute of American Poultry Industries
221 N. La Salle Street • Chicago 1, Illinois

Look For Our Booth At N. C. A.

open fire furnace. Ample storage space for supplies is provided in the 18 by 20 foot warehouse which adjoins one end of the kitchen.

"Our cream batches run about 35 pounds," Robert Naas said. "Fudge and caramel are handled in 20 pound batches, suckers run about 30 pounds and other hard candies are handled in batches of about 40 pounds."

In 1940 the firm departed in a relatively small way from its retail rule and began putting out novelty lollypops.

"We introduced two large lines," Robert Naas said. "We put out a flat pinwheel lollypop with the largest, 11 inches in diameter, weighing nearly two pounds," he said. "And it has turned out to be a good seller. Candy distributors have placed the lollypops in shops all over the state. But they're strictly a novelty item," he added.

Mr. Naas said the departure did not indicate a general move into the wholesaling business.

"The quality candy manufacturer must be very particular about how his candy is handled before it gets into the hands of the consumer," he said.

"Although we have expanded our facilities each time we moved into another location we have handled our own retail sales, and I believe we always will," Mr. Naas said. "If the candy manufacturer lets any corner store or stand handle his soft candies he has to assume they will be stored and displayed under the worst kind of conditions. That means using preservatives, and it just isn't possible to put out the finest candy if you have to use preservatives. Our own product is without a doubt our own best advertising feature, and we don't intend to jeopardize it," he added.

A popular packaging feature at Naas Candies is a line of odd sized, gaily colored metal boxes imported from England by the I. D. Co., New York City. "They've attracted quite a bit of attention among our customers because of their odd shape and the unusual, colorful designs lithographed on them. We also use them to dress up the sales room," Mr. Naas said.

These large pops are a speciality of Naas, and are wholesaled throughout the state. They are the only wholesale item made by this firm.

"With very few exceptions our advertising dollars have been channeled into building up our location here on the highway," Mr. Naas said. "However, as an institutional advertising program we have sponsored a boys hardball team in the junior baseball league in San Jose

It's hard to do...but it can be done and Wilbur does it again and again

The secret is *control*—Control in the factory is just as important as control on the bowling alley. And "control" is the watchword at Wilbur-Suchard. Month after month, the delicious Wilbur Chocolate Coating you select will have exactly the same rich *color*. Only long experience in the blending of ingredients makes possible such close, consistent *color control* in the manufacture of fine Wilbur Chocolate Coatings.

WILBUR UNIFORM QUALITY CHOCOLATE COATINGS

WILBUR-SUCHARD CHOCOLATE COMPANY, INC. • LITITZ, PA.

for 19 years. The program has brought us a lot of advertising, and through the team personnel turnover during that time we have made a lot of friends among the boys and their parents."

But putting up money alone for an athletic team doesn't do much good, according to Henry Naas. "You've got to work with them and stay with them right through the season if you want a team with spirit. It doesn't do much good, and it isn't much fun to sponsor a team that winds up way down the line at the end of the season. They've got to be good or they can do the business more harm than good."

The quality of the firm's ball team is indicated by Jim McDonald, a former member who in recent years has advanced to the majors where he has pitched big league ball the past five years.

Although the first Naas Candies in 1930 were wholesaled to small fountains and independent stores in the San Jose area, the El Camino Real location is the only retail outlet for the firm's products today, except for the giant lollypops.

"We have plenty of facilities for turning out wholesale quantities, but there are too many problems involved," Robert Naas said.

He said the firm has been experimenting with a mail order program to supply customers from distant points who are introduced to the line on vacation trips that take them along the highway.

"Many of those people stop in on their way home and ask us how they can get our candy," Mr. Naas said. "We have corrugated mailers and have been mailing to some customers for several years. Nearby customers who leave for the summer months frequently order from us by mail, too," he added. "We are considering furnishing a post-card ordering plan, with stocks of cards stacked on our counters. And we may include a post-card order blank in each package we mail out," he said.

Although his shop is about three miles from the downtown section of Santa Clara, Robert Naas believes a highway location is best for a quality candy store operating on a relatively small scale.

"We don't have much walk-in business, but we have learned that people will come to you wherever you are if you manufacture good candy," he said.

"Our customers don't stop in as often now that we're on the highway, but they buy in larger quantities," Robert Naas said. The store is open seven days a week and evenings until nine for customers' convenience.

The firm packs in a variety of box sizes, including one, 1½, two, three and five pound boxes. An all-chocolate one pound pack sells for $1.30.

There are a lot of potential pitfalls involved in turning out quality candy, according to Robert Naas, "but there's enough sugar and spice and everything nice to make it well worth while," he added.

...a brand new CANDY ingredient that's really different!

CRANSWEETS*

—the sweetest cranberries in all the world!

Delicious Cransweets are firm, whole preserved cranberries, ready to be used in a cordial center. They're made by a process that retains both the natural color and the distinctive cranberry flavor. Sweetness is added, but a touch of tartness remains to provide that mouth-watering appeal. Cransweets are as easy to handle as other fruit centers. Packed in sizes of 1300 to 3000 count per gallon — six pounds of drained fruit. Add taste-tempting cordialized Cransweets to your candy line now.

*Trademark of Wisconsin Alumni Research Foundation

send for your FREE sample

Get acquainted with Cransweets. Obtain a generous sample, by sending a request on your letterhead to:

CRANBERRY PRODUCTS, Inc.

EAGLE RIVER, WISCONSIN

WALTER BAKER INTRODUCES top-quality chocolate coatings IN A REVOLUTIONARY NEW FORM!

"3-to-the-ounce" Baker's La Belles— easy to handle, quick to melt— can save you time, manpower, *money!*

Here they are *actual size*—Baker's La Belles —the completely new high-grade vanilla and milk chocolate coatings. Now you can get the finest quality in a form that saves you both time and money.

Far easier to handle than the 10-pound cakes, these *3-to-the-ounce* La Belles cut down melting time alone by nearly 50 per cent!

During the convention, make it a point to drop by booth #506 and see the new Baker's La Belles. Or write for free samples. Walter Baker Division, General Foods Corporation, Dorchester 24, Mass.

***Chocolate makes it* good . . .**

***Baker's makes it* best**

(*Continued from page 40*)

consisting of sucrose and invert or may contain considerable amounts of corn syrup. The latter range in content between 25-40% and the type of corn syrup used, almost without exception, is the regular corn syrup of 42.0 D.E.

What is the function of corn syrup in hard candy? The most important is its control of crystallization of sucrose. In clear, hard candies, when used in sufficient amount, it actually completely prevents the formation of crystals. It is more effective in this than invert and this is due in a large part to its dextrine content. The high conversion corn syrups, as is indicated by their higher D.E., have a much lower dextrine content than the more commonly used regular corn syrup. Therefore, the high conversion corn syrups are less effective in this function and quite a bit more would have to be used to achieve the same goal.

Corn syrup is also important in hard candy because it gives a desirable body or high viscosity. This again is a function of the dextrine content and the high conversion corn syrups are less potent in this respect. More would have to be used in proportion to the sucrose and this would introduce other troublesome factors which we will touch on briefly.

This viscosity effect on the solid solution, the confection called hard candy, can easily be demonstrated by making two hard candies by the same formula but using high conversion corn syrup in one and regular standard corn syrup in the other. The lollipop, sour ball, candy square or any similar bulk packaged hard candy will tend to lose its shape, to flow, when made with the high conversion corn syrup. This distortion of the shape is a function of the temperature. In the Summer at 90° to 100° F, it will be more pronounced than at 60° F.

The unit of viscosity measurement is the centipoise. This possible effect on the shape of the candy as a result of the viscosity is clearly indicated by the table on the viscosities of the three main corn syrup groups given in Mr. J. Kooreman's preceding paper on "The Physical and Chemical Characteristics of Enzyme Converted Corn Syrups". The firmest, hard candy with the least tendency toward distortion of its shape can actually be made by using a corn syrup of 32.0 D.E. The use of this syrup has never become popular in confections because it has other drawbacks in candy production.

Corn syrup in general is a desirable constituent in hard candy when correct amounts are used because it is easier to produce those items without experiencing trouble with stickiness. This detrimental characteristic can, of course, be met with if we use too much corn syrup but probably a slight excess of invert syrup or cream of tartar are more often responsible, when either of these is used as an alternate means of controlling crystallization. It also results from abuses of production conditions. We are, however, at the present, concerned only with the proper use of corn syrup and the type of syrup best suited for this purpose to illustrate limiting factors in the utilization of high conversion corn syrups.

A hard candy, especially the transparent type, should have a finished moisture of less than 1.0%. Experience has shown that in order to get satisfactory shelf life that must be the goal. Stickiness is related to moisture adsorption. Is hard candy made with regular 42.0 D.E. corn syrup less likely to adsorb moisture from its surroundings than one in which a high conversion 62.0 D.E. is the ingredient syrup?

A consideration of the moisture adsorption of the two syrups will give us a clue although it is not the entire story. The fairest and most logical conclusion is arrived at if the two candies are compared under varying humidity and temperature conditions. J. E. Cleland and W. R. Fetzer in the Industrial & Engineering Chemical Journal, Vol. 36, Page 552, June, 1944, give a comparison of the syrups. At a 78% of relative humidity, the high conversion corn syrup adsorbs from 3.5 to 4.0% more water at a temperature of 25°-30° C than the regular corn syrup. This, of course, is not as great a difference as exists between these syrups and invert but it does constitute a danger signal. With other factors, it may become a contributor to a possible sticky condition.

If we replace a regular corn syrup of 42.0 D.E. with a high conversion corn syrup to control crystallization, we may have another additive factor towards stickiness in the hard candy. Depending on the amount of regular corn syrup that is being used and substituted for by the high conversion type of corn syrup, the boiling point is raised in the candy batch from 2-4° F. This may not appear significant at first glance but if it is not taken into account, the hard candy will not finish at the desirable moisture content of 1.0% or less. To overcome this, the candy has to be cooked to a higher temperature or must be held a longer time under vacuum.

There is another hidden factor in the use of these syrups which also has to be considered. The high conversion corn syrups exist in commerce in two groups based on whether or not an ion-exchange system of refining has been used. A definite price differential between them governs their sale; those syrups having been made with the aid of ion-exchange refining commanding a premium. These are the desirable syrups for use in these candies because they are more resistant to color formation. It seems evident that when high conversion syrups are to be used, a greater heat abuse will be experienced.

The confectioner for a long time, often without realization, has been depending for the control of his inversion in candy batches on the buffers present in regular corn syrup of 42.0 D.E. The ash content of 0.28% in this syrup contains these buffers that aid in preventing undue inversion of the sucrose he uses. The high conversion corn syrup produced without ion-exchange refining has a similar condition with an ash content of 0.32%. These buffers act as safety factors in this control of stickiness. The ion-exchanged, high conversion syrups will have an ash content of .05% and, hence, are practically devoid of these buffers since this type of refining removes them. Therefore, the candy maker must remember this and has to take it into account since he will boil to somewhat higher temperatures and for a longer time to avoid a contribution to stickiness.

This does not mean necessarily that satisfactory

hard candies cannot be made with these syrups. Proper choice of containers and wrappings would aid. It would also require exceptional care and considerable modification of the production processes. This they do not have to resort to when using the regular 42.0 D.E. corn syrup which, in addition, is a more economical commodity. That is why the high conversion corn syrups have not attained any appreciable use in these type of candies.

Brittles, crunches, chip candies, butterscotch, kisses and taffies are related to the hard candies. In all of these, the viscosity change and consequent possible tendency to flow, and the raising of the boiling point are critical factors. Individual wrapping of the candies and the unit packaging can minimize the limitation of these syrups. In pulled candies of this type, the viscosity can affect the production difficulties, increasing them noticeably. At any rate, these syrups do not find the ready acceptance that regular corn syrup enjoys.

In pastille work, the high conversion syrups have to be increased to obtain the necessary body and protection against crystallization. An increase in gum arabic, gelatin or other body giving agents usually affects the eating qualities adversely. Too large a proportion of corn syrup may result in sweating and stickiness.

The lack of body as compared to regular corn syrup also reacts unfavorably to the use of high conversion corn syrups in Turkish paste. The same is true in the case of Halvah candies. Undue stickiness is also detrimental. We believe these objections can be minimized by changing the cook but these process changes raise the cost of production as compared to regular corn syrup.

A large amount of high conversion corn syrup is utilized in gum work with satisfactory results. This has been aided by the development of high setting value thin boiling starches. More effective drying conditions have to be practiced especially if the syrup to sucrose is above 1:1.

When a chewy, firm texture is desired, the high conversion syrup is not recommended. Its characteristics yield a tender and shorter piece. This should be borne in mind when considering its use in certain types of nougats and caramels. The lower viscosity or "body" of these syrups is the cause of this effect. When these candies are individually wrapped, sticking to the paper may result. This does not happen with regular corn syrup.

The so-called high sucrose creams should rather be made with regular corn syrup than by use of high conversion syrup. The latter is preferred since it is a more effective controller of crystallization.

These few remarks should aid in guiding the candy maker, indicating to him the candy items in which the use of high conversion corn syrups cause difficulties. The syrups have tremendous advantages in many candies as pointed out by Mr. F. Hanly Brock. They certainly offer the candy maker a challenge to possibly create new confections based on their peculiar characteristics.

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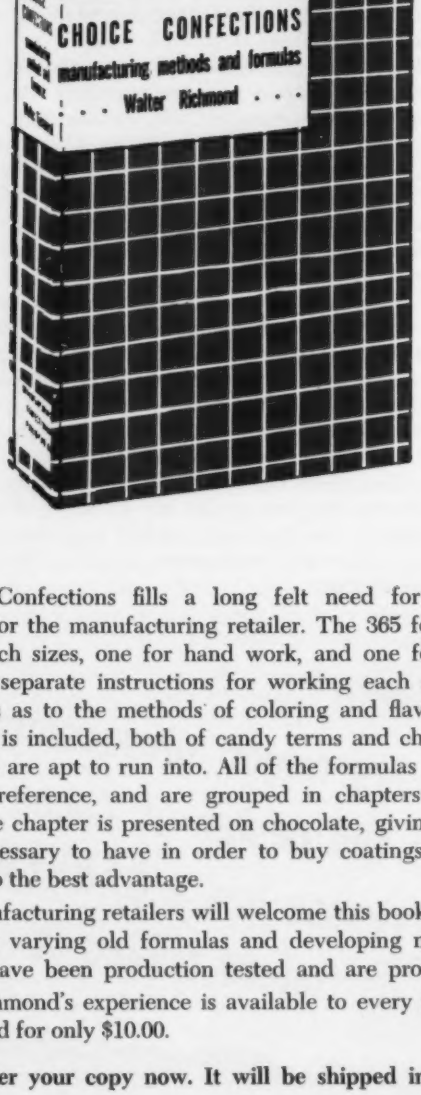

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Trends in Certified Colors

by DR. SAMUEL ZUCKERMAN, *H. Kohnstamm & Co., Inc.*

As processers and manufacturers of food products we are all familiar with the Food, Drug and Cosmetic Act of 1938. Under this Act a system for the certification of coal-tar colors was set up. It provides for three separate lists of colors—only one of which the FD&C list (colors for use in foods, drugs and cosmetics) can be used in foods. The other two lists the D&C (drugs and cosmetics) and the EXT. D&C (externally applied drugs and cosmetics) may not be used in products to be consumed as foods.

At the present time there is under consideration a proposal for re-listing three of the FD&C colors to External D&C colors. A hearing on this matter was held in Washington last year and to date the final order has yet to be issued.

This action has received some publicity in the trade press and I think a discussion on the history of certified colors, and what criteria were used in establishing the present list is in order.

The use of coloring matter was recognized by Congress as a problem which might affect the health of the nation.

In May 1900, under the allocation of funds for the general expenses of the Bureau of Chemistry, there was included an item "To enable the Secretary of Agriculture to investigate the character of proposed food preservatives and coloring matters, to determine their relation of digestion and health and to establish the principles which should guide their use."

Several years prior to the passage of the Food & Drug Act of 1906, the Secretary of Agriculture appointed Dr. Bernard C. Hesse as an expert consultant on coal-tar colors. Dr. Hesse had had broad experience in this subject through long association with the leading dyestuff manufacturers in Germany. He made an extended study of the coal-tar dyes that were then in use for the coloring of foods for the purpose of determining what restrictions, if any, should be placed on their use. This investigation included not only a very detailed and exhaustive search of the literature concerning the chemistry and physiology of these coal-tar colors and the laws of the various countries and states regarding their use, but included also many chemical examinations in his own and the Bureau of Chemistry's laboratories.

Based on Dr. Hesse's study a list of seven colors were accepted as harmless and our first voluntary system of certification had its birth. These colors were —ORANGE I, INDIGOTINE, NAPHTHOL YELLOW, PONCEAU 3R, AMARANTH ERYTHROSINE and LIGHT GREEN SF yellowish.

Provision was made for the addition of new colors to the above seven and evidently Dr. Hesse's rules of selection prevailed because all colors subsequently added were all physiologically tested. This is indicated by the fact that in an official department publication, R. W. Dunlap, Acting Secretary of Agriculture stated "The original list of seven permitted dyes was selected after a critical study of the reports of pharmacological tests on the more important dyestuffs. The other eight dyes were added to the list after appropriate pharmacological and toxicological tests had proven them harmless."

The additional colors and their dates of admission were:-

TARTRAZINE—1916—Water Soluble Yellow
YELLOW A.B.—1918—Oil Soluble Yellow
YELLOW O.B.—1918—Oil Soluble Yellow
GUINEA GREEN B—1922—Water Soluble Green
FAST GREEN FCF—1927—Water Soluble Green
PONCEAU SX—1929—Water Soluble Red

SUNSET YELLOW—1929—Water Soluble Yellow

Brilliant Blue FCF was the last of the coal-tar colors added to the permitted list of food dyes until after the Food, Drug & Cosmetic Act of 1938 went into effect.

Early in July 1938 conferences were begun with food, drug, cosmetic and coal-tar color manufacturers. In collaboration with the technical members of these industries, the available coal-tar colors were again examined (repeating the work of Dr. Hesse) and a weeding out process was begun based on:-

1—toxicity
2—extent of use
3—essential nature because of special properties
4—duplication of shade
5—stability, with particular reference as to whether or not they were light-fast or alkali-fast and
6—chemical purity

After the elimination of many colors on the basis of the above criteria, many manufacturers of coal-tar dyes were asked to submit one pound samples of a number of coal-tar colors. These compounds were chemical entities of known composition, not complex salts or mixtures and a certain degree of purity was specified. The manufacturers were also asked to submit structural formulae for the dyes and adequate methods of analysis. At that time the Division of Pharmacology of the Food & Drug Administration under Dr. Herbert Calvery had had investigations of the fifteen permitted food colors under way for over two years and over 125 individual colors had been tested. In the proposed regulations the fifteen original certified food colors were listed as the FD&C colors, (colors for foods, drugs and cosmetics). In addition provisions were made for admitting new colors after similar investigations and hearings were held.

At the present time there are nineteen FD&C colors, the last one having been admitted in 1950. They are:-

FD&C ORANGE #2—Oil Orange SS
FD&C RED #32—Oil Red XO
FD&C YELLOW #2—Naphthol Yellow S. (K. salt)
FD&C VIOLET #1—Wool Violet 5BN

The nomenclature FD&C was used in order to prevent any possible mistake or mixup in the use of an un-certified coal-tar dye in place of a certified one. For example, Tartrazine, a water soluble yellow dye is used quite extensively as a textile colorant. When highly purified so that it meets FD&C specifications, it is known as FD&C Yellow #5, not as Tartrazine.

No other Government has guarded with such care the colors that may be used in foods, drugs and cosmetics. The manufacturer must submit to the Government samples from every batch, to be analyzed for purity before certification, and the official lot-test number must then accompany the colors through all subsequent packagings. In addition to the 19 colors listed for Foods, Drugs & Cosmetics, there are available many other synthetic colors for internal and external Drug and Cosmetic use.

The manufacture of these colors of certifiable purity is a highly specialized branch of the dyestuff industry because extra-ordinary precautions and controls are necessary to eliminate or exclude objectionable side reaction products and metallic impurities. For example, the maximum amounts of lead and arsenic permissible are 10 ppm and 1.4 ppm respectively. The water, acids, alkalies, solvents and intermediates used must all be the purest obtainable.

Producers and sellers of color cannot open a package of color that has been certified and do anything at all with it without losing the right to call it certified. Certification is safeguarded by the Government to such an extent that as soon as any container of dye is opened it is no longer considered to be certified. If it is mixed with other certified colors in order to produce a desired shade, the mixture must be re-certified.

If a large package is broken and, without mixing or adulteration, is re-packed in smaller containers, even the re-packs must be submitted for re-certification.

In recent months there has come up for consideration the question of the revision of coal-tar color regulations as a resulf of pharmacological studies which show that certain of the colors on the present list of 19 FD&C colors are capable of producing harmful effects when fed to experimental animals at a level many times in excess of the amounts normally used in foods. Recent and even more extended investigations along this line involving larger dosage levels and longer term feeding experiments indicated that three of the 19 colors; the water-soluble FD&C Orange #1 and the two oil-solubles FD&C Red #32 and FD&C Orange #2 might not be considered certifiable as "harmless" under any and all conditions of use. There is no knowledge of any harm that has ever resulted from their proper use nor can it be said definitely that any injury would result from the continued proper use. Nevertheless FDA's position is that as long as under section 406-B of the Food and Drug Act, FDA certification means "harmless and suitable" at any dosage level, they feel that they can no longer certify the above colors.

A hearing was held on January 19, 1954 in Washington to receive evidence to determine whether to amend the regulations for the certification of the above mentioned colors. As of this date the Secretary of Department of Health, Education & Welfare has not handed down her decision on this matter.

In addition to the three colors mentioned above FDA has stated that similar action may be taken on the two remaining oil soluble colors; FD&C Yellow #3 and FD&C Yellow #4. However, since the toxicological and pharmacological studies on these two colors have not been completed, action is being deferred until such time when the data is complete.

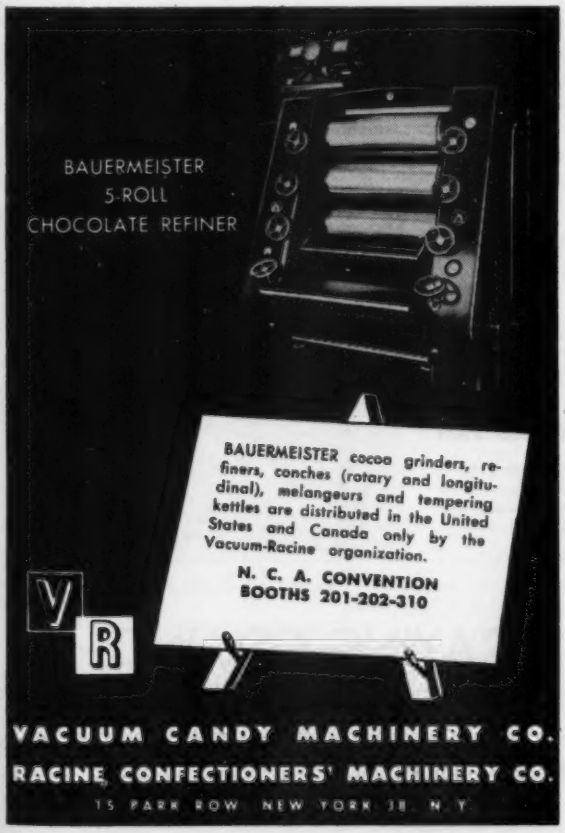
Food & Drug has intimated that the Secretary does not have the authority to inquire into the amounts of dye which will be ingested under normal conditions of product use nor to set limits or tolerances regarding the concentration of the dye in a particular product and that under the term of the Act a dye may be used only if it is harmless, regardless of amount and that any dye exhibiting toxic effects on laboratory animals cannot be regarded as harmless.

Industry on the other hand has taken the view

that the question of safety or harmlessness of a dye or any other natural or synthetic compound for that matter, can only be determined by reference to quantities ingested or concentrations employed.

We believe that in determining the meaning of the word "harmless," there must be taken into consideration accepted scientific procedures and methods in determining the safety of substances and their suitability for proposed use. It is well established and generally recognized that in making any determination of safety and suitability for use, the most important factors requiring consideration and determination are the circumstances under which the test material is expected to be used and the extent and quantity proposed for such use. Not only is this a matter of general knowledge, but this premise has also been agreed to on the record by the Government expert. Materials which, by application of these procedures and methods, are determined to be incapable of producing harmful effects under the anticipated circumstances, are said to be safe, hence, "harmless and suitable for use" even though they did produce harmful effects at high level feedings.

It is a well known fact, admitted by the Food & Drug Authorities, that even common table salt would produce adverse physiological effects if taken in quantities of two to three ounces. The entire problem was very well stated by Dr. Bernard Oser in a recent article entitled "Can a Poison Exist in a Vacuum?" "There is no foundation in toxicology for regarding all substances as either poisonous or deleterious, on the one hand, or safe or harmless, on the other. The optical physicist has his absolute white and absolute black, but there are no absolutes for the toxicologist. 'Toxicity' depends on species, age, weight, sex, dosage, route of administration, physiological or pathological state, and manifold other factors comprising 'experimental conditions.' Translation of toxicity data into terms of real or potential effect under any given set of circumstances, as for example, the determination of hazard to any particular segment of the population or to the public health generally, involves considerations that go far beyond toxicity effects in laboratory animals." (Oser, Can a Poison Exist in A Vacuum?, A discussion of Section 403(a), 8 Food, Drug, Cosmetic Law Journal, 693, at 696 (1953).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The coal-tar color industry, and in turn the users of the above mentioned certified colors, have been advised that in the event of a de-listing order, all stocks of the FD&C colors in question in the hands of manufacturers and food processers that have already been certified, may be used in the customary food applications.

In view of these recent events your certified color supplier has prepared substitutes for the water-soluble FD&C Orange #1. These substitutes are blends of other FD&C colors mixed in such proportions so as to match FD&C Orange #1 over as wide a concentration range as possible. However, since FD&C Orange #1 is the strongest azo color, tinctorially speaking, on the FD&C list, a larger amount of substitute color will be required to give the same shade. For example, a typical blend of colors to give a cocoa shade with FD&C Orange #1 contains FD&C Orange #1, FD&C Red #2, FD&C Blue #1 and FD&C Yellow #5.

These substitutes are also available as the flash-free type for use in puddings, dry drink powders and gelatin desserts.

Unfortunately there are no available substitutes for the oil-soluble colors under question with other oil-soluble certified colors. However, the color scientists have developed new methods of application for the water-soluble colors to be used in edible fats. These water-in-oil dispersions of color in finished food products have proved satisfactory in many cases.

The development of new coal-tar colors to be submitted as new FD&C colors are long range projects, and nothing new is anticipated for at least two years.

Generally speaking, the quality and cleanliness of the certified colors have been improved considerably in the past decade. Due to the new and improved materials of construction, more accurate analytical chemical operations and syntheses and new and improved activated carbons and better filter media, the colors are now being certified at dye contents far above the minimum amounts required by the specifications written for them, with exceptional clarity and lack of taste and odor.

The present certified colors are available in almost any physical condition. Dry Powders as "straights" or secondaries; semi-solids as paste colors; or plastic cubes of predetermined weight; and liquid colors either in a sterilized aqueous solution or in any other desired edible solvent.

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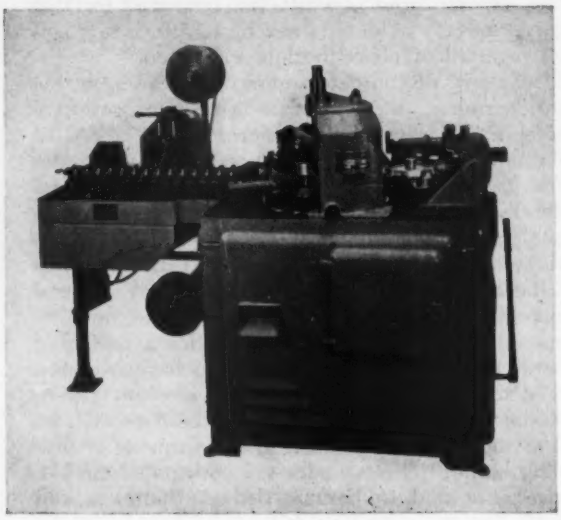

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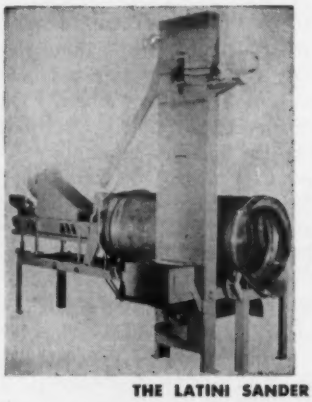

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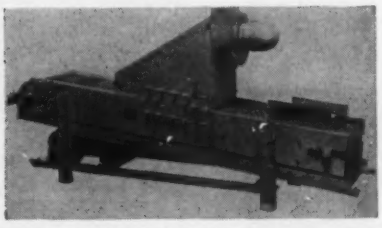

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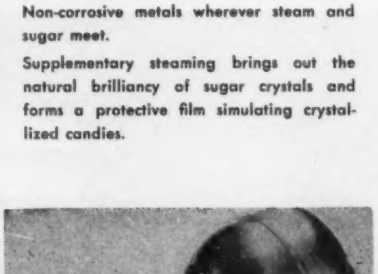

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by WILLIAM I. GORFINKLE, *J. O. Witten Company*

The "One-Shot" system of making fudge and cream continuously is based on simple principles of chemistry, using newly-developed gelatins with additional properties. Chemistry can help us produce good candy at lower cost. Most of the recent advances in candy technology are the result of applying engineering principles, new types of equipment, and devices for making easier the handling of materials. Controls help us make more uniform products, with less scrap. Chemistry—the knowledge and proper use of old and new materials of confectionery—can be extremely helpful in our endeavors.

Fudge and cream are basically similar. Cream, in a simple definition, is a suspension of fine crystals of sugar in a more-or less aerated heavy syrup of mixed sugars. Fudge is a similar product that contains also skim milk and fat, not necessarily milk fat.

Cream is made usually by cooking a syrup, cooling carefully, agitating the cool syrup to cause the grain to form, making fondant. This fondant is usually remelted with the aid of a bob, some frappe or mazzetta is added to aerate and whiten the goods, and we have cream. The fine grain is produced by the formulation, the concentration of the syrup, careful cooling, and agitation.

Fudge is simpler, yet similar. There is more bob and less fondant. Milk and fat are added, also, to give the desired character.

In the "One-Shot" method of making cream and fudge, all the ingredients are mixed while fluid. Eight-tenths percent, or less, of extra-high strength gelatin is in the batch. There is no remelting of fondant. The fluid is whipped and aerated in any kind of marshmallow beater, and cast. It is thought at present that it is better to use a beater that can cool at the same time, but our work has not gone far enough to be definite on this. Creams are cast in dry starch and can be sifted out in reasonable times. This type fudge can be cast or it can be poured onto tables and cut, or into aluminum trays or waxed boxes, then cooled and packed.

This method is based on the development and production in marketable quantities of extra high strength gelatin with two properties particularly desirable for this work. First, this gelatin will set in low concentrations, less than 0.8%, so low that there is no gumminess when the piece is eaten. It is very short. Even at this low concentration, however, there is enough colloidal protection present to control the size of the sugar grain.

Second, this gelatin will whip even in the presence of fat. The bubble formation in this sugar syrup-fat-gelatin whip is small and even, similar to that in marshmallow—and often smaller. There is no frothiness or soap-bubble appearance, with the weak cell structure that we used to get when we added cocoa or chocolate directly to a batch of marshmallow.

In this method, as you probably realize, we are in effect making the fondant, bob, and frappe at the same time and in the same place. In other words, we are making the fudge (or cream) in "one-shot".

This method of making these pieces works with high sugar—low corn syrup or with lower sugar—higher corn syrup mixtures. We have found that we must use more of the sugar as invert, and thus the pieces mellow more quickly. It appears also, probably due to the setting power of the extra-high strength gelatin, that we can run with a higher moisture content. As one of my friends has said "Who doesn't want to sell water?" —and make a more mellow piece, too.

The "One-Shot" fudge liked by most people was made this way:

We brought to a boil:
60 lbs. sugar
16 lbs. water
We *added*:
30 lbs. corn syrup
10 lbs. invert
1 lb. skim milk solids (in solution)
2 oz. salt
We continued to boil to 236° F. We cooled the batch to 160-170° F. and *added*:
0.8 lbs. extra high strength gelatin in 3 lbs. water
We stirred everything very thoroughly and we *added*:
12 lbs. Chocolate liquor and flavor.
The batch was whipped at 130° F. to 9 lbs. per gallon and deposited in trays.
For fudge with more grain, we used a syrup made of:
66 lbs. sugar
17 lbs. invert sugar
For a home-made type, the syrup was made of:
75 lbs. sugar
5 lbs. corn syrup
20 lbs. invert sugar

It is possible to add more fat to any of these batches, but it was found that most tastes did not want it.

It appears that the presence of the gelatin holds some moisture and the piece does not dry out as quickly as would be expected with the low fat content.

The cream centers are made in a similar manner, but, of course, without the chocolate, milk, and salt. In the case of the creams, the 75-5-20, or high sugar, formulation tested best to us.

After the gelatin is incorporated, flavor and invertase, as desired are added. We found helpful the addition at this point, of:
1 pound fondant
or 0.5 powdered sugar

This helps set up the center quickly by starting crystallization.

We found, thus far, that this system works better when the batch is whipped or aerated to between 7½ and 9 lbs. per gallon. We found that many people prefer the fluffy fudges and creams.

These pieces are smooth, light, and easy to eat. When eaten, they show no signs of gelatin—no chew at all. They can be made firmer by cooking the syrup higher.

If we examine the first formula (60-30-10), we see that the sugar content is high enough to give some grain, and that the rest of the sugars are non-crystallizing. This means that they will stay in solution and give a heavy density syrup which will cut down the chance of fermentation.

This sugar-corn syrup ratio (actually 70-30) gives a piece that has a slight "bite" to it. This is considered desirable in a cream by some people. Most people seem to like a cream that is shorter. For large pieces, like mint patties, the 66-17-17 ratio (sugar-corn-syrup—invert) seemed desirable.

For this, then, we made a syrup thus:-
66 lbs. sugar
17 lbs. corn syrup
17 lbs. invert sugar
16 lbs. water

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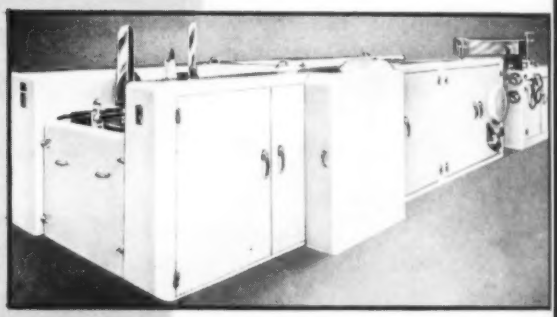

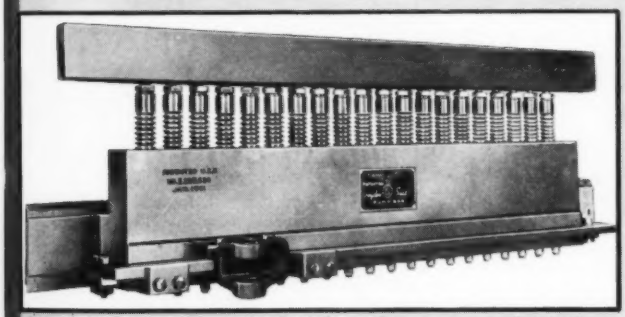

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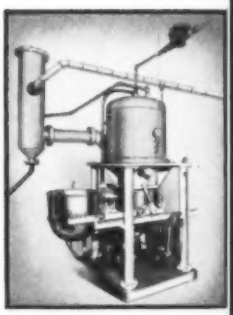

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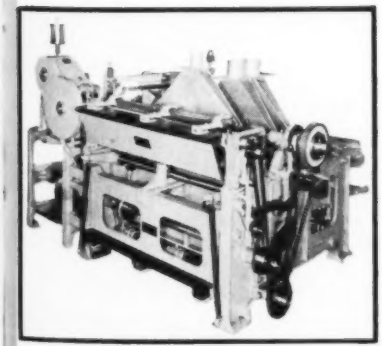

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This was cooked to 234°-236° F., and it was cooled then to 170° F. We added then:-

0.6 to 0.8 lbs. extra high strength gelatin soaked or dissolved in 3 or 4 lbs. water. This was stirred thoroughly and cooled gently to 130° F. Invertase, flavor, and color were added, as desired.

We added also to the cream batch one pound of fondant (extra fine sugar crystals) or ½ pound of fine powdered sugar.

The batch was whipped then (we found 8 lbs. per gallon made pleasant eating) and cooled to 100°-105° F., if a cooling type beater is used. These pieces were cast in dry starch, let stand until ready, and sifted out. The time for this depended on the cook—the higher the cook, the faster the piece could be brushed out.

We found that the addition of fondant helped start the grain and speeded up the setting-up of the piece. It is quite possible that this addition may not be necessary in a continuous beater that can cool the batch rapidly. Our preliminary checks on this show that this rapid cooling will form fine grains.

We found out that we could not get the texture as fine when made on conventional marshmallow beaters. We do feel that the continuous beaters, with their forced whip and much more thorough agitation, will give most desirable textures.

Since many people prefer very short pieces, we made some high sugar creams. In order to keep the syrup density high, we used a high percentage of invert sugar. This piece mellowed rapidly. We sometimes had a little trouble with pieces sticking if sifted out fairly quickly and let stand in heaps too long before coating.

The syrup on these was:-

75 lbs. sugar
5 lbs. corn syrup
20 lbs. invert sugar

Syrup was cooked anywhere from 232° to 240° F., as desired. All other factors were unchanged—temperature, gelatin, invertase, etc.

These pieces are quite short and pleasant. We think they should be made on forced whip beaters to get the most desirable structure, although pieces made in an ordinary beater are quite suitable for bulk creams, bars, and eggs.

We have done nothing yet with creams having added fat. Our work with fudge, however, leads us to believe that these creams will be quite desirable.

By understanding and using the properties of our ingredients, particularly the newly-developed extra-high strength gelatins, we feel that we have made a good start on a simple, inexpensive way of making good fudge and cream. This method differs radically from the standard in that the grain is formed and controlled in the presence of a small amount of very high strength gel. By continuing to apply chemical *and* engineering principles—technology, if you will, the next few years should bring forth the making of any desired fudge or cream this simple way.

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Tempering of confectioner's coatings

by NORMAN W. KEMPF, *Walter Baker Div., General Foods Corp.*

The procedure used in tempering confectioners coatings varies according to the type of fat used. If the fat used is prepared from domestic oils, it is likely to have a wide melting point range with a high stearin content. Users of this type of fat report that relatively little attention need be paid to tempering because seed crystals of the high melting (138° F) stearin are easily formed and are always present when the fat is held below its melting point.

At the present time, however, the greater volume of confectioners coatings is produced from tropical fats containing lauric acid. These fats have special texture characteristics which make them desirable for this purpose. By suitable fractionation or ester rearrangement, it is possible to produce a fat which has a rather narrow melting point range, one of the desirable characteristics of cocoa butter. With fats of this type, proper tempering is just as essential for good gloss and satisfactory shelf life as is the case with cocoa butter. These fats, like cocoa butter, are polymorphic; and it is important to establish seed crystals of their most stable form before proceeding with the final setting up of the fat. As with cocoa butter, this can be accomplished in two ways, first by slow cooling with agitation to give time for the highest melting form to establish crystal nuclei without permitting the less stable forms to come about.

The second procedure is to cool more rapidly and then reheat to destroy the unstable forms which get their start while preserving the stable nuclei as the final seed. To do this well with confectioners coatings, it is obvious that we need complete knowledge of the melting point of the stable type crystals to enable us to operate as closely to their meling point as possible without actually melting them.

Because of the number of fats available on the market for use in manufacturing confectioners coatings and the wide variation in the characteristics of these fats, the need for obtaining exact tempering information from your coating manufacturer is evident. This is especially true if you change from one type of coating to another as procedures carefully worked out and proven for one product may fail completely to give success with another containing a different fat.

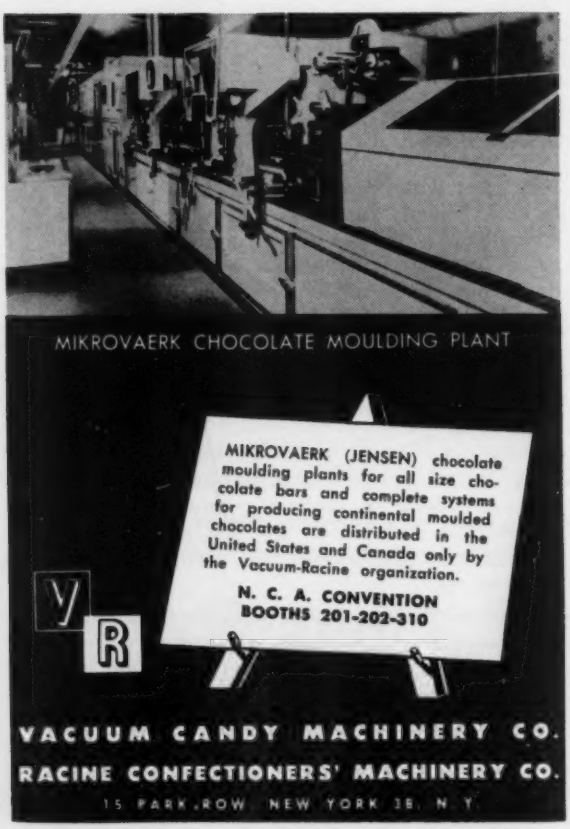
The availability of time is generally the factor which determines the procedure used. One very successful practice consists of starting the day off by bringing the coating in the enrober to a slight "mush" immediately reheating to operating temperature and then continuing the operation throughout the day by either drip or bucket feeding the coating at a temperature which will balance heat losses from the enrober and

thus maintain a constant operating temperature throughout the day. This method takes advantage of the normal heat loss from the enrober to supply a continuing supply of stable seed.

In any type of enrober operation while using confectioners coatings, it is vitally important to avoid the use of very cold water in the jacket of the line from the pump to the spreader, as the locally produced low temperature can be the cause of formation of unstable seed crystals in the coating with no opportunity for destroying these from this point on. The crystals formed at this critical point are going to be in the coated candy and have their effect on preventing proper latent heat removal in the tunnel.

Experience with confectioners coatings seems to indicate that once a proper seed has been established in the enrober, there is less danger of losing this seed by temporary overheating than is the case with true chocolate. One of the chief troubles encountered has been loss of gloss due to overseeding the coating. When this situation occurs, the size of the seed crystals builds up to a point where a grainy surface is formed on the coating and gloss is lost because of surface roughness.

To sum up, the principles involved in tempering confectioners coatings made with lauric fats are the same as those covering the tempering of chocolate coatings. The actual temperature employed may be different, however, because the melting points of the fats used are different from that of cocoa butter.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Advertising space in *The Manufacturing Confectioner* is available only to firms supplying equipment, materials, and services for the use of confectionery manufacturers. Advertising of finished confectionery products is not accepted.

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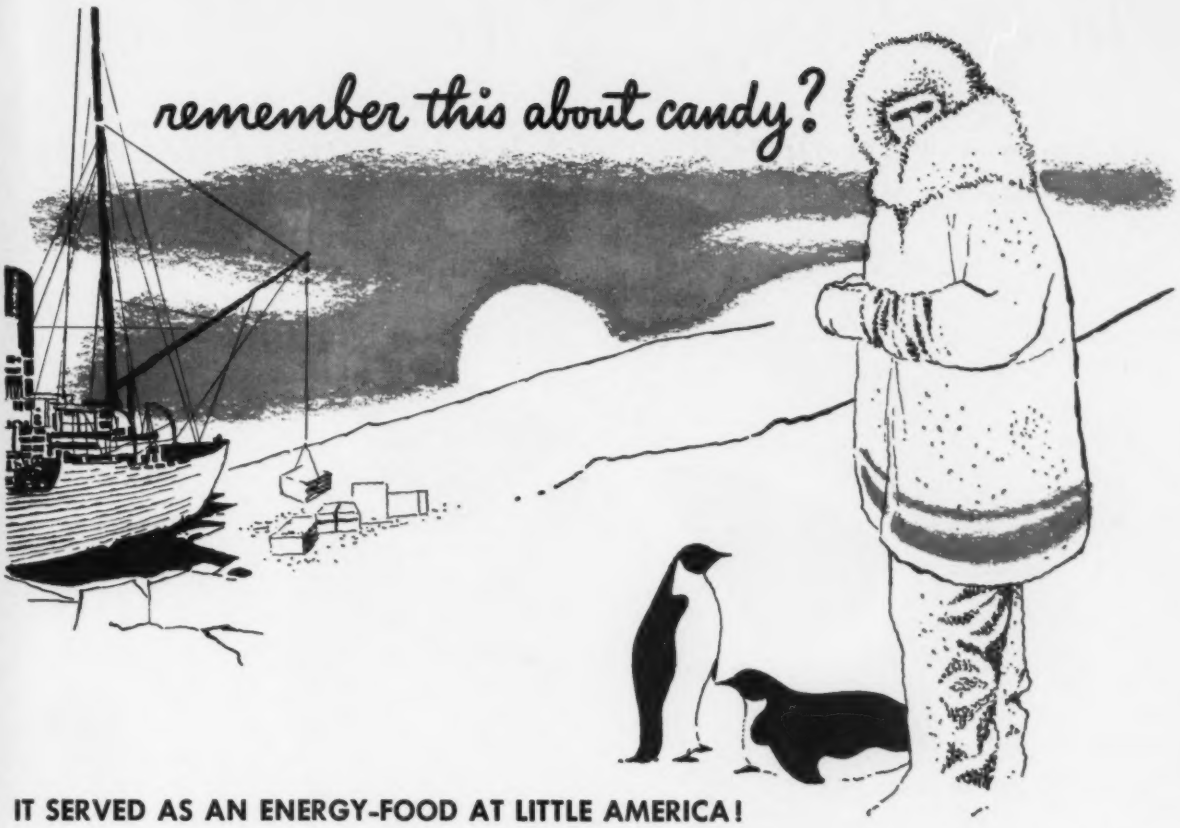

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